

Core
Mathematics:
Level 3
Certificate in
Mathematical
Studies
Handbook

AQA

Core Maths (Level 3
Certificate Mathematical
Studies)
Course Code: 1350A

Name:

Course Structure

This course is studied as an AS Level, one year course.

Examinations – End of course, June of Y12

Paper 1	Paper 2A
What's assessed	What's assessed
<u>Analysis of data;</u> <ul style="list-style-type: none">• Data• Collecting and sampling data• Representing data numerically• Representing data diagrammatically <u>Finance;</u> <ul style="list-style-type: none">• Numerical calculations• Percentages• Interest rates• Repayments and cost of credit• Graphical representation• Taxation• Solution to financial problems <u>Estimation;</u> <ul style="list-style-type: none">• The modelling cycle• Fermi Estimation	<u>Critical Analysis of given data and models</u> <ul style="list-style-type: none">• Presenting logical and reasoned arguments in context• Communicating mathematical approaches and solutions• Analysing critically <u>The Normal Distribution</u> <ul style="list-style-type: none">• Properties of a normal distribution• Notation• Calculating probabilities <u>Probabilities and Estimation</u> <ul style="list-style-type: none">• Population and sample• The mean of sample size n• Confidence intervals <u>Correlation and regression</u> <ul style="list-style-type: none">• Correlation• The product moment correlation coefficient• Regression Lines
How it's assessed	How it's assessed
<ul style="list-style-type: none">• Written exam: 1.5 hours• 60 marks• 50 % of AS-level	<ul style="list-style-type: none">• Written exam: 1.5 hours• 60 marks• 50 % of AS-level
Questions	Questions
A mix of question styles, from short, single-mark questions to multi-step problems	A mix of question styles, from short, single-mark questions to multi-step problems

There are internal assessments throughout the course that will be completed in lessons.

Each assessment provides opportunities to review your progress.

Email addresses of your teachers:

Lhill@corsham.wilts.sch.uk
ACrawley@corsham.wilts.sch.uk

Course Content

Overarching Themes

Analysis of Data

Content	Confidence	Revised?
D1.1 Appreciate the difference between qualitative and quantitative data		
D1.2 Appreciate difference between primary and secondary data		
D1.3 Collect quantitative and qualitative primary and secondary data		
D2.1 Infer properties or populations or distributions from a sample, whilst knowing the limitations of sampling		
D2.2 Appreciate the strengths and limitations of random, cluster, stratified and quota sampling methods and applying this understanding when designing sampling strategies		
D3.1 Calculate/identify mean, median, mode, quartiles, range, interquartile range and standard deviation		
D3.2 Interpret these numerical measures and reach conclusions based on these measures		
D4.1 Construct and interpret diagrams for grouped discrete data and continuous data, know their appropriate use and reach conclusions based on these diagrams		

Maths for Personal Finance

Content	Confidence	Revised?
F1.1 Substitute numerical values into formulae, spreadsheets and financial expressions		
F1.2 Use conventional notation for priority of operations, including brackets, powers, roots and reciprocals		
F1.3 Apply and interpret of accuracy, specify simple error intervals due to truncation or rounding		
F1.4 Find approximate solutions to problems in financial contexts		
F2.1 Interpret percentages and percentage changes as a fraction or a decimal and interpret these multiplicatively		
F2.2 Express one quantity as a percentage of another		
F2.3 Compare two quantities using percentages		
F2.4 Work with percentages over 100%		
F2.5 Solve problems involving percentage change, including finding the original value		
F3.1 Calculate simple and compound interest, including the Annual equivalent rate (AER)		
F3.2 Work with savings and investments		
F4.1 Work with student loans and mortgages, including the Annual Percentage Rate (APR)		
F5.1 Plot points to create graphs and interpret results from graphs in financial contexts		
F6.1 Work with income tax, National Insurance, and Value Added Tax (VAT)		
F7.1 Deal with the effect of inflation, including the Retail Price Index (RPI) and Consumer Price Index (CPI)		
F7.2 Set up, solve and interpret solutions to financial problems, including those that involve compound interest using iterative methods		
F7.3 Currency exchange rates including commission		
F7.4 Budgeting		

Estimation

Content	Confidence	Revised?
E1.1 Represent a situation mathematically, make assumptions and simplifications		
E1.2 Select and use appropriate mathematical techniques for problems and situations		
E1.3 Interpret results in the context of a given problem		
E1.4 Evaluate methods and solutions including how they may be affected by assumptions made		
E2.1 Make fast, rough estimates of quantities which are either difficult or impossible to measure directly		

Critical Analysis

Content	Confidence	Revised?
C1.1 Criticise the arguments of others		
C2.1 Summarise and write reports		
C3.1 Compare results from a model with real data		
C3.2 Critically analyse data quoted in media, political campaigns, marketing, etc.		

Statistical Techniques

The normal distribution

Content	Confidence	Revised?
S1.1 Recognise normally distributed data		
S1.2 Describe the properties of a normal distribution		
S1.3 Use your knowledge about specific standard deviations and their probabilities		
S2.1 Understand and write the correct notation to describe a normal distribution		
S2.2 Understand and write the correct notation to describe the standardised normal distribution		

S3.1 Use a calculator or tables to find probabilities for normally distributed data with known mean and standard deviation		
S3.2 Use a calculator or tables to find values for normally distributed data with known mean, standard deviation and probabilities		

Probabilities and Estimation

Content	Confidence	Revised?
S4.1 Understand what is meant by the term 'population' in statistical terms		
S4.2 Develop ideas of sampling to include the concept of a simple random sample from a population		
S5.1 Know that the mean of a sample is called 'a point estimate' for the mean of the population; appreciate that accuracy is likely to be improved by increasing the sample size		
S6.1 Calculate confidence intervals for the mean of a normally distributed population of known variance using δ^2/n		

Correlation and regression

Content	Confidence	Revised?
S7.1 recognise when pairs of data are uncorrelated, correlated, strongly correlated, positively correlated and negatively correlated		
S7.2 Appreciate that correlation does not necessarily imply causation		
S7.3 Understand the idea of an outlier, identify and understand outliers and make decisions whether or not to include them when drawing a line of best fit		
S8.1 Understand that the strength of correlation is given by the pmcc		
S8.2 Understand that the pmcc always has a value in the range from -1 to +1		
S8.3 Appreciate the significance of a positive, zero or negative value of pmcc in terms of correlation of data		
S9.1 Plot data pairs on scatter diagrams and draw, by eye, a line of best fit through the mean point		
S9.2 Understand the concept of a regression line		
S9.3 Plot a regression line from its equation		
S9.4 Use interpolation with regression lines to make predictions		
S9.5 Understand the potential problems of extrapolation		
S10.1 Use a calculator to calculate the pmcc from raw data		
S10.2 Use a calculator to calculate the equation of the regression line from raw data		



Level 3 Certificate MATHEMATICAL STUDIES

Formulae Sheet

Information

This formulae sheet should be issued to all candidates for use with all Mathematical Studies examinations.

These formulae are not required to be learnt. A clean copy of this formulae sheet will be issued to you in the examination.

Volume and surface area

Shape	Volume	Surface area
Cone	$V = \frac{1}{3}\pi r^2 h$	$A = \pi r l + \pi r^2$
Sphere	$V = \frac{4}{3}\pi r^3$	$A = 4\pi r^2$
Pyramid	$V = \frac{1}{3} \text{base} \times h$	

Financial calculation – AER

The annual equivalent interest rate (AER), r , is given by

$$r = \left(1 + \frac{i}{n}\right)^n - 1$$

where i is the nominal interest rate, and n the number of compounding periods per year.

Note: the values of i and r should be expressed as decimals.

Financial calculation – APR

The annual percentage interest rate (APR) is given by

$$C = \sum_{k=1}^m \left(\frac{A_k}{(1+i)^k} \right)$$

where $\pounds C$ is the amount of the loan, m is the number of repayments, i is the APR expressed as a decimal, $\pounds A_k$ is the amount of the k th repayment, t_k is the interval in years between the start of the loan and the k th repayment.

It may be assumed that there are no arrangement or exit fees.

END OF FORMULAE SHEET

Revision Resources:

- Text book given to you at the start of the course – must be returned or replaced at the end of the year.
- Past papers can be found on the AQA website:
www.aqa.org.uk



Go to Qualifications; Level 3 Certificate in Mathematical Studies

- www.TLMaths.comm

Lots of useful videos for some of the topics (that cross over with A Level Maths)

- www.youtube.com



Search for a topic to see worked solutions and examination tips.

Exam tips from AQA examiner reports

Use a soft pencil to draw graphs – this will make the scanning easier!

Check the answer is of the correct form – especially when asked for and.p or s.f. answer

Look for connections between parts of the same question

Do not round prematurely!

In 'show that' questions all necessary steps in the workings must be shown

Learn to match the number of marks to the amount of work required

Make sure your responses include the statistics to support your argument