

## Core Maths

### AQA Mathematical Studies Overview

Through out the course students will be given an introduction to the use of spreadsheets and will be required to use and develop their own to solve both financial and statistical problems

#### Teacher A

Know the difference between Qualitative and quantitative data	
Know the difference between Primary and secondary data	
Know the limitations of sampling	
Know the positives and negatives of each sampling technique including, random, cluster, stratified, systematic, quota	
Calculate mean, mode, median, IQR, quartiles, percentiles, standard deviation and variance (from raw data, stem and leaf diagrams, frequency tables, grouped frequency tables)	
Use measures of dispersion and spread to compare and make inferences about data.	
Construct diagrams for grouped discrete data and continuous data	
Use diagrams to make comparisons between sets of data	
Drawing cumulative frequency curves and using them to find median, quartiles and percentiles	
Draw and interpret boxplots	
Draw and interpret histograms	
Draw and interpret stem and leaf including back to back	
knowledge that this is a symmetrical distribution and that the area underneath the normal 'bell' shaped curve represents probability	
use of the notation $X \sim N(\text{mean}, \text{var})$ to describe a normal distribution in terms of mean and standard deviation	
using a calculator or tables to find probabilities for normally distributed data with known mean and standard deviation	
understanding what is meant by the term 'population' in statistical terms	
developing ideas of sampling to include the concept of a simple random sample from a population	
knowing that the mean of a sample is called a 'point estimate' for the mean of the population	
confidence intervals for the mean of a normally distributed population of known variance using $\text{sd}^2 / n$	
recognising when pairs of data are uncorrelated, correlated, strongly correlated, positively correlated and negatively correlated	
appreciating that correlation does not necessarily imply causation	
understanding the idea of an outlier	
understanding that the strength of correlation is given by the pmcc	
understanding that pmcc always has a value in the range from $-1$ to $+1$	
appreciating the significance of a positive, zero or negative value of pmcc in terms of correlation of data	
the plotting of data pairs on scatter diagrams and the drawing, by eye, of a line of best fit through the mean point	
understanding the concept of a regression line	
plotting a regression line from its equation	
using interpolation with regression lines to make predictions	
understanding the potential problems of extrapolation	
where raw data is given, students will be expected to use a calculator to calculate the pmcc and the equation of the regression line	

#### Both Teachers will work on developing students ability to do the following:

criticising the arguments of others	
summarising and report writing	
comparing results from a model with real data	
critical analysis of data quoted in media, political campaigns, marketing etc	

#### Teacher B

Use formulae in spreadsheets	
Use order of operations	
Apply limits of accuracy	
Find approximate solutions to financial problems	
Interpret and calculate percentage problems	
Interpreting percentages and percentage changes as a fraction or a decimal and interpreting these multiplicatively	
expressing one quantity as a percentage of another	
comparing two quantities using percentages	
working with percentages over 100%	
solving problems involving percentage change, including percentage increase/decrease and original value problems including simple and compound interest	
Annual Equivalent Rate (AER), Savings and Investments, Annual Percentage Rate (APR)	
plotting points to create graphs and interpreting results from graphs in financial contexts	
income tax, National Insurance, Value Added Tax (VAT)	
the effect of inflation Retail Price Index (RPI), Consumer Price Index (CPI)	
setting up, solving and interpreting the solutions to financial problems, including those that involve compound interest using iterative methods	
currency exchange rates including commission	
budgeting	
representing a situation mathematically, making assumptions and simplifications students will engage in the tackling of 'open' mathematical problem-solving where there may not be a clear single approach or 'correct' answer	
selecting and using appropriate mathematical techniques for problems and situations	
interpreting results in the context of a given problem	
evaluating methods and solutions including how they may have been affected by assumptions made	
Fermi Estimation-making fast, rough estimates of quantities which are either difficult or impossible to measure directly	
Know basic facts of perimeter, area, surface area and volume to aid estimations	
Know key facts about country populations, e.g. UK, average populations of towns and cities to aid estimations.	

Assesments:  
 Year 12 progress week - April  
 Year 13 trail exams - January