AQA Core Mathematics / Mathematical Studies

Welcome to Mathematics at Helena Romanes School and Sixth Form Centre!

Thank you for choosing to study Core Maths (AQA Level 3 Certificate in Mathematical Studies 2B) as your future pathway in our sixth form. At HRS, you will have 8 lessons a fortnight and you will sit an exam at the end of Year 12.

Core Maths is an exciting new mathematical qualification with clear links to the real world. The subject is a Level 3 Certification, an A/S is worth half a full A-level. Mathematics can be used to help people make decisions, form business plans, and understand in detail the information they are presented with every day.

Core Mathematics aims to help students become more mathematically aware, in order to be more employable and less susceptible to the mathematical pitfalls of life. This course is ideal if you enjoy Maths but are not taking the A-Level, and as a course to support your other A-Level studies, such as Economics. It is also widely welcomed by many universities, with some altering entry requirements for those who gain a high grade in this qualification.

Core Maths must be taken seriously as there are numerous benefits to studying this course; the skills developed in the study of Core Maths are increasingly important in the workplace and higher education. Also, taking Level 3 Core Maths, as a future pathway, can result in receiving alternative offers from many universities (University of Bath, University of Sheffield and many more). Below is an excerpt from the University of Sheffield website;

> From September 2019, if we offer you a place on certain courses with a GCSE Maths requirement, and you're taking one of the following Core Maths qualifications, we'll make you an alternative offer equivalent to one A Level grade below the standard entry requirements for your course, subject to you achieving a specific grade in Core Maths.
>
> - AQA Level 3 Certificate Mathematical Studies

Level and beyond! To give you an insight into the course, here are some aspects you can expect to study:

1. **Representing and Interpreting Data**

This section is about comparing and interpreting data and being able to analyse key information, developing your communication skills and providing you with insights to what many jobs involving data and spreadsheets will feel like.

2. Maths for Personal Finance

This section is about the maths that adults say they wish they had learnt at school. You will learn how to calculate income tax, national insurance, and student loan repayments. You will start to understand AER and APR. This section will mostly be applying the percentages used throughout GCSE Maths.

3. Fermi Estimation

"How many times does your heart beat in a year?"

"How many tennis balls fit inside a double-decker bus?"

This section is about getting a 'rough' answer to a calculation, you will never get the exact answer to! The questions above cannot have an exact answer – there are too many factors involved. In a group of 20 people, there could be 20 different answers, each of which would be correct if you can state the assumptions you make and justify YOUR calculations.

Watch this video to see how these sorts of calculations work and why they are called Fermi Estimations, please make some notes on this video:

https://ed.ted.com/lessons/michael-mitchell-a-clever-way-to-estimate-enormous-numbers

4. Critical Analysis of Data

“81.6% of all statistics are made up on the spot!”

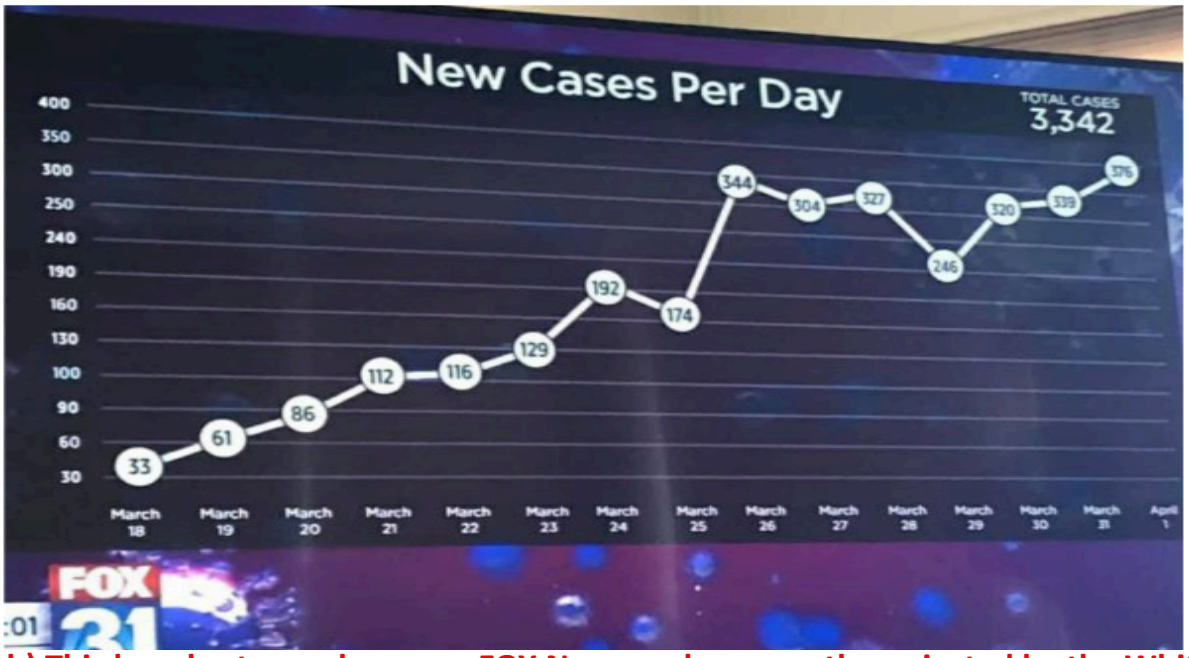
This section is about being able to look behind the statistics, graphs and claims made in the media and being able to unpick whether the graph or claim is valid.

“3 Ways To Spot A Bad Statistic”

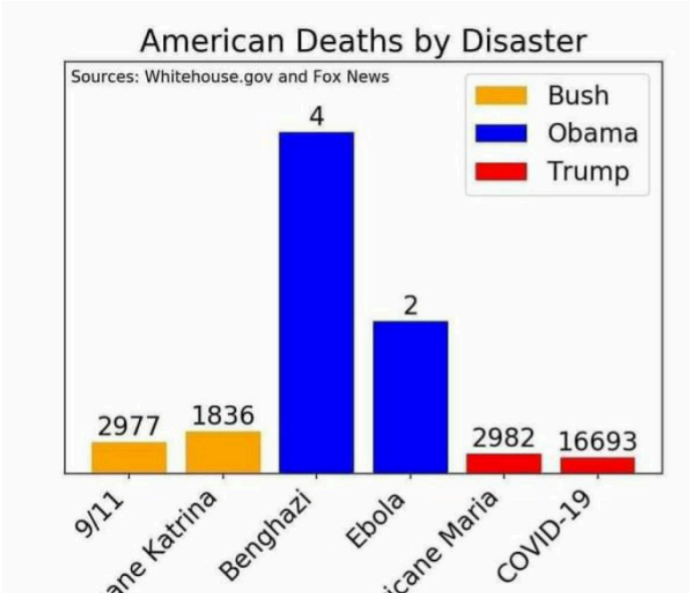
Please make some notes on thsi video:
https://www.ted.com/talks/mona_chalabi_3_ways_to_spot_a_bad_statistic/footnotes?c=207625

- The graphs below are actually from News and Media outlets around the world on Coronavirus Covid-19.
- What is wrong with them? What do you think they are trying to convey with these graphs?

a) This graph was projected by channel FOX31 (United States)



b) This bar chart was shown on FOX News and apparently projected by the White House



As you can see, data is an important part of Core Maths, and so we need to ensure your knowledge of handling data from GCSE is up to standard. If you are comfortable with these topics, you will have a solid grounding in Core Maths and be well on your way to achieving the best outcome. So, for the first phase of this bridging unit, we will focus only on data topics which appear frequently in the Core Maths exam.

Task

Below are some videos on Data from Corbett Maths (www.corbettmaths.com) which can help you prepare for Core Maths in September. Click on the website, click on 'Videos' or 'Worksheets'. Search the video numbers, watch the videos, attempt the practice or textbook exercises to have a solid foundation in your GCSE Maths and begin in September with confidence!

*Topics highlighted in **bold** are of utmost importance, you must watch the videos, make notes, and attempt the practice questions*

Topic	Corbett Maths
Types of Data	**342 - Types of data: Qualitative & Quantitative**
	343 - Types of data: discrete & continuous
	343a - Types of data: primary & secondary
Collecting & Sampling Data	**281 - Sampling: stratified**
	282 - Sampling: random
Numerical Representations of Data	50 - Averages: median
	51 - Averages: median (frequency table)
	52 - Averages: median (grouped data)
	53 - Averages: mean
	54 - Averages: mean (frequency table)
	55 - Averages: mean (estimated)
	56 - Averages: mode
	57 - Averages: range
Diagrammatic Representations of Data	**149 - Graphs: box plots- draw\interpret**
	150 - Graphs: box plots (compare)
	151 - Graphs: conversion graphs (draw)
	152 - Graphs: conversion graphs (interpret)
	153 - Graphs: cumulative frequency (draw)
	154 - Graphs: cumulative frequency (reading)
	155 - Graphs: frequency polygons (draw)
	156 - Graphs: frequency polygons (reading)
	157 - Graphs: histograms (draw)
	158 - Graphs: histograms (interpret)
	159 - Graphs: histograms harder
	160 - Graphs: line graphs
	169 - Graphs: stem and leaf (draw)
	170 - Graphs: stem and leaf (interpret)

Core Maths – Phase 2

For Part 2, we will be focusing on skills needed for the Finance section of Core Maths.

There are many parts to Finance: Exchange rates, APR, AER, interest, National Insurance, Tax, Student Loans, mortgages etc. All of the topics mentioned require students to have a solid grounding in using the four operation with Money, use of percentages, ratios and decimal multipliers.

Money is an extremely necessary part of life likewise calculating with money and being financially savvy is just as important, we need to know how to spend wisely, budget, see if a discount is credible, calculate our earnings after tax and there are other many well-known factors why Cash is King!

In the final task, I have attached a video of a typical real-life scenario in regards to a salary that is earned and it will show you how Tax and National Insurance is deducted. It is also the type of question you will be asked in your exam next summer!

Task 1

1. Below are a selection of GCSE videos from Corbett Maths (www.corbettmaths.com) which can help you prepare for Maths in Personal Finance topic in Core Maths. Read your way down the list and look at which topics you will need a refresher

2. I have hyperlinked the video numbers in the table which will take you the relevant video. Likewise, I have hyperlinked the topic names in the table, if you click on the topic, it will take you to the appropriate worksheet where you will be able to test your understanding. If there is no link attached, that means there is no video coinciding with that subject.

3. Alternatively, you can click on the website, click on 'Videos' or 'Worksheets'. Search the video numbers, watch the videos, attempt the practice or textbook exercises to have a solid foundation in your GCSE Maths and begin Maths for Personal Finance in confidence!

Topic	Video - Worksheet
Percentages	233 – Percentage Change
	235 – Percentages of an amount (calculator)
	236 – Percentages: Compound Interest
	238 – Percentages: Increasing/Decreasing
	239 – Percentages: Multipliers
	240 – Percentages: Reverse
Exchange Rates	214a – Number: Currency (Exchange Rates)
& Money	8 – Money Problems
Ratio	210 – Number: Best Buys
	270 – Ratio: Sharing the total

	271b – Ratio: difference between 271e – Ratio: Problem Solving

Task 2

This task is for you to gain an insight and an overview into the world of wages and salaries, click on the following link:

https://www.bbc.co.uk/bitesize/guides/z8wjh39/revision/2

Once you have access to the link, you will see 3 tabs, then follow these instructions:

1. Click on the middle tab labelled 'Video'. Watch the video and make notes.

2. Click on the left tab labelled 'Revise'. Have a read of the information, go through all 5 slides, make notes on key pieces of information, attempt the examples at the end of the pages and copy the answers to ensure you have correct notes in your book.

3. Finally, click on the right tab labelled 'Test'. Attempt the 10 questions to the best of your ability, once you have completed the test, click on 'Check Score' and reflect on how well you have done and what you have learnt from this exercise.

Task 3

If you earn £50,000 a year, how much money would you take home each month after deducting Tax and National Insurance? On the next page you will find the rates of Income Tax and National Insurance you will pay dependant on how much you earn for the Tax Year 2017-18, there is also small pieces of information how to calculate your deductions. Use the tables below to calculate your 'take-home' pay. Once you have calculated your 'take-home' pay, watch the following video and see if your answer is correct!

Video: Income Tax & NI - £50,000 a year