Y11-12 Core Maths Bridging Work

Level 3 Mathematical Studies (Core Maths) is a new qualification designed for students who have achieved a grade 4 or above at GCSE.

It helps to develop students' mathematical skills and thinking and supports courses such as A-level Psychology, Sciences and Geography as well as technical and vocational qualifications.

Level 3 Mathematical studies comprises of compulsory content and optional content. At King Edward VI Lichfield, we elect to study towards Paper 2A of the optional content; focusing a lot on statistical analysis of data. More details and the AQA specification can be found here: https://filestore.aqa.org.uk/resources/mathematics/specifications/AQA-1350-SP-2014.PDF

In summary, throughout Core Maths you will study:

- Analysis of Data
- Financial Maths
- Modelling and Estimation
- Critical Analysis
- The Normal Distribution and Confidence Intervals
- Correlation and Regression

Possible Reading/Websites List

- Rob Eastaway's book ***Maths on the Back of an Envelope*** is a great introduction into Estimation. https://www.amazon.co.uk/Maths-Back-Envelope-overcome-calculations/dp/0008324581
- Nrich have a collection of problems with a Core Maths twist https://nrich.maths.org/12524
- Questions inspired by a news story or QUIBANS are a great way to get you thinking about real life data; critically analysing as you go. There are lots of great examples at https://quibans.blogspot.com/2015/12/what-are-quibans.html. Have a go at a few.
- These podcasts explore the numbers and statistics used in political debate, the news and everyday life, and include references to many contemporary issues. You may wish to listen to one or two https://www.bbc.co.uk/programmes/b006qshd

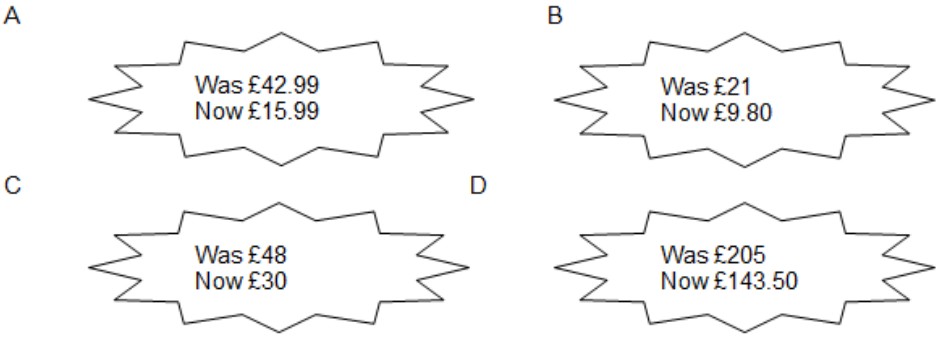
Tasks to Complete:

1. Research 'Fermi Estimation' and summarise in your own words what it is. Try to include an example if you can. Then read the article at https://www.wired.com/2014/08/how-to-solve-crazy-open-ended-google-interview-questions/.
   Work through the Piano Tuners and Empire State Building open ended questions as you read the article, ensuring that you are able to follow where the numbers and the Maths comes from!

2. Watch
https://www.ted.com/talks/mona_chalabi_3_ways_to_spot_a_bad_statistic?language=en
Make a short summary of the skills required to spot bad statistics
Further explore Mona Chalabi's work here: https://www.theguardian.com/profile/mona-chalabi

3. Remind yourself of how to successfully compare data using box plots by watching this video and working through the example as you go https://youtu.be/Q2OF86ZUYMs

4. Try these percentages questions to keep your GCSE skills fresh! (Answers underneath)



1. Which is the biggest percentage reduction? A,B,C or D

2. The population of a town grows from 47 300 to 50 500. What is the percentage increase? Give your answer to **one decimal place**.

3. What is the multiplier for a 1.6% decrease?

4. Mrs Smith goes on a rail journey with a friend. The friend has a rail card which gives her 20% off the cost of her ticket. Mrs Smith pays full price. The cost of both tickets together is £71.19. How much is Mrs Smith's ticket?

5. 32% increase in robberies in a year.

Assume the figure in the headline above has been rounded to the nearest 1%

There were 430 robberies after the increase.
Use the headline figure to find how many robberies there were before the increase.

Answers to task 4:

1. A The reduction is £42.99 − £15.99 = £27.

   Comparing to the original price 27 ÷ 42.99 = 0.628…
   As a percentage, this is 62.8%.

2. The increase is 50 500 − 47 300 = 3200.
   Comparing to the original population 3200 ÷ 47 300 = 0.0676…
   As a percentage, this is 6.8%.
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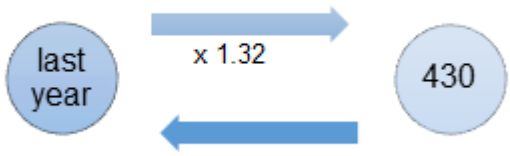
   Comparing to the original population 3200 ÷ 47 300 = 0.0676…
   As a percentage, this is 6.8%.

3. 100% − 1.6% = 98.4%
   As a decimal, this is 98.4 ÷100 = 0.984.
   The multiplier is 0.984

4. Mrs Smith pays 100%.
   Her friend pays 100 – 20 = 80%.
   Together they pay 100 + 80 = 180%
   180% = £71.19 so 100% = (71.19 ÷ 18) x 10 = £39.55

5. The multiplier for a 32% increase is 1.32



Last year's robberies = 430 ¸ 1.32 = 325.75….

The number of robberies was 326 or 325