INTRODUCTORY TASKS

Y11 to Y12 Core Mathematics

Subject	**Core Mathematics / Mathematical Studies**
Context	**An introduction into some of the topics within the course that will enable you to consolidate prior learning.**
Wider readings and research	You may want to use any revision resources from GCSE to help support you with this task such as BBC bitesize, GCSE Pod or mathswatch.
Written tasks	Answer the questions attached on A4 file paper, and to the maths office by **4th September 2020.**

Core Maths Bridging Tasks

A) **Estimation**

These are estimates of totals or amounts which are very difficult to guess. You build up final estimates using reasonable estimates of aspects of the problem and then combine these estimates appropriately to give you an overall estimate.

EXAMPLE: Estimate the number of human heartbeats in the UK each year.

SOLUTION: There are two key components to estimate here:

a. The number of times a heart beats in a minute – estimate 80.

b. The population of the UK – estimate 70 million.

- Now for one person in one year the number of beats will be:
- 80 x 60 beats per hour. (4800)
- 80 x 60 x 24 beats per day. (115200)
- 80 x 60 x 24 x 365 beats per year. (42048000)

So, for the population of the UK that would be 70 million x 42048000 million. (29433600000)

Luckily this is a calculator qualification. The important aspects of answering this question are stating the estimates around heart beats in a minute and population of the UK, and calculation steps which lead to the final answer.

Now attempt an estimate for:

1a. How long you will spend on the phone in your lifetime.

1b. How many white cars there are in the UK?

B) **Percentages**

Try these questions – we will be going through these early in the course.

1. Three batches of electrical resistors are analysed for defects:

   Batch 1: Out of 235 resistors, 12 are found to be substandard.

   Batch 2: Out of 470 resistors, 17 are found to be substandard.

   Batch 3: Out of 711 resistors, 29 are found to be substandard.

   a. Calculate the percentage of substandard resistors in each batch. Quality control requires that no more than 5% of resistors are substandard. Which batches, if any, fail to meet this requirement?

   The three batches of resistors are mixed together.

   b. i) Calculate the percentage of substandard resistors in the all resistors.

   Batch 4 is then combined with the other three batches. The percentage of substandard resistors across all four batches is 0.04. The number of substandard resistors in Batch 4 is 4.

   Ii) How many resistors were in Batch 4?

2. Hashima, a coal-mining island in Japan, experienced a huge increase in population in the period after the Second World War. In 1950, the population was 862. In 1952, the population was 3,243. By way of contrast, the population of Huddersfield increased from 105,140 to 110,306 in the same period.
    a. Calculate the increase in population of both Hashima and Huddersfield.
    b. Calculate the percentage increase for the two places.
    c. In which location do you think the effect of the population rise was more significant? Explain your answer.

3. A Core Maths student is investigating how well people can estimate distances. Two students, Sarah and Arfan, estimate the length of the college's study centre to be 15m and 23m, respectively. The actual length is 18.6. Calculate the percentage errors of the students, and state which one was more accurate.

4. An environmental pressure group has persuaded a local industry to change the way they operate. Fishermen report that 28 pike have been caught in a pond during the last year, into which the industry had previously deposited waste. If this represents a 40% increase, calculate the number of pike caught previously.