What is Core Maths?

Why Core Maths?

Currently, only around 20% of students study mathematics beyond GCSE in the UK – the lowest rate in leading developed countries in the world.

According to the Higher Education STEM project, many students arrive at university with unrealistic expectations of the mathematical and statistical demands of their subjects, leading to a lack of confidence and anxiety by the students.

The Core Maths qualification has been introduced to address these issues and, importantly, the qualification also counts towards the Level 3 mathematics achievement measure in 2017 Performance Tables.

Designed to maintain and develop real-life mathematics skills, what students study can be applied on a day-to-day basis whether in further study or employment. Most courses will include a financial mathematics element and can help with other A level subjects, including science, geography, business studies, economics and psychology.

The skills developed in the study of mathematics are increasingly important in the workplace and in higher education. Most students who study mathematics after GCSE improve their career choices and increase their earning potential.

https://www.stem.org.uk/core-maths/students-parents-carers

GRADE	UCAS POINTS
A	20
B	16
C	12
D	10
E	6

How is Core Maths taught?
Core Maths builds on GCSE mathematics with a particular focus on problem-solving skills. You will consider and tackle mathematics in meaningful contexts, including financial applications and statistical ideas that can support work in other subjects they will be studying.

"Students in social sciences, business, psychology, sciences, and health sciences who are not taking A/AS Level mathematics may find the Core Maths element useful in preparing for university study where a working application of maths or statistics may be required." - Aston University statement

Todays Objectives:

- Know about the limitations of sampling and how to sample fairly.
- Be able to find the mean from a frequency table.
- Be able to draw a cumulative frequency graph.
- Analyse a cumulative frequency graph to find the median and quartiles.

Types of Sampling

Where is sampling used in real life?

What issues could you foresee with sampling?

	Random	Systematic	Stratified
What is it?	People are chosen at random e.g. names picked from a hat or using a random number generator on a calculator. Every member of the population has an equal chance of being chosen	Members of the population are chosen at regular intervals, such as every 100th person from a telephone directory.	When the population is composed of different groups of people, we may wish to choose our sample so that it contains the same proportion of each group as the entire population.
Advantage	Every member of the population has an equal chance of being chosen, which makes it fair.	You are unlikely to get a biased sample.	It is the best way to reflect the population accurately.
Disadvantage	It can be very time consuming and usually impractical.	It is not strictly random: some members of the population cannot be chosen once you have decided where to start on the list.	It is time consuming and you have to limit the number of relevant variables to make it practical.

Stratified Sampling

For example, if 60% of our population is female, a stratified sample would be 60% female too.

Stratified Sampling

The number of students in each year group at a school
is shown in the table:

Year group	Number of students
7	180
8	200
9	170
10	190
11	160
TOTAL	900

Sample Numbers
$180 \div 18 = 10$
$200 \div 18 = 11$
$170 \div 18 = 9$
$190 \div 18 = 11$
$160 \div 18 = 9$
$10 + 11 + 9 + 11 + 9 = 50$

Suppose that a stratified sample of size 50 students needs to be chosen.

$$900 \div 50 = 18$$

We therefore need to divide each of our totals by 18

Averages from a Table

Price	Freq.		
0 < £ ≤ 10	3		
10 < £ ≤ 20	6		
20 < £ ≤ 30	2		
30 < £ ≤ 40	12		
40 < £ ≤ 50	13		
50 < £ ≤ 100	6		
100 < £ ≤ 150	2		
150 < £ ≤ 200	1		
Total	45		

Maria has 45 pairs of shoes and recorded how much each pair costs.

Can we calculate the mean?

As we do not know the exact value of each piece of data, we can only calculate an estimate for the mean.

We cannot multiply by a class interval, so we need to choose an appropriate number from each group to multiply by the frequency. What should we choose?

The midpoint…

Price	Freq.	Mid-Point	
0 < £ ≤ 10	3	5	
10 < £ ≤ 20	6	15	
20 < £ ≤ 30	2	25	
30 < £ ≤ 40	12	35	
40 < £ ≤ 50	13	45	
50 < £ ≤ 100	6	75	
100 < £ ≤ 150	2	125	
150 < £ ≤ 200	1	175	
Total	45		

Maria has 45 pairs of shoes and recorded how much each pair costs.

Can we calculate the mean?

As we do not know the exact value of each piece of data, we can only calculate an estimate for the mean.

We cannot multiply by a class interval, so we need to choose an appropriate number from each group to multiply by the frequency. What should we choose?

The midpoint…

Price	Freq.	Mid-Point	Freq x MP
0 < £ ≤ 10	3	5	15
10 < £ ≤ 20	6	15	90
20 < £ ≤ 30	2	25	50
30 < £ ≤ 40	12	35	420
40 < £ ≤ 50	13	45	585
50 < £ ≤ 100	6	75	450
100 < £ ≤ 150	2	125	250
150 < £ ≤ 200	1	175	175
Total	45		2035

Maria has 45 pairs of shoes and recorded how much each pair costs.

Can we calculate the mean?

As we do not know the exact value of each piece of data, we can only calculate an estimate for the mean.

We cannot multiply by a class interval, so we need to choose an appropriate number from each group to multiply by the frequency. What should we choose?

The midpoint…

Estimate for the mean

2035 ÷ 45

= £37

The table below shows the number of minutes students were late for their fun Maths lesson in the Autumn Term.

(a) Draw a **Cumulative Frequency Diagram** of the data

(b) Use it to find the **Median**, **Lower Quartile**, **Upper Quartile**, and **Inter Quartile Range**

Time t (mins)	Number of Students	Cumulative Frequency
$0 < t \leq 5$	10	
$5 < t \leq 10$	16	
$10 < t \leq 15$	30	
$15 < t \leq 20$	22	
$20 < t \leq 25$	2	

The table below shows the number of minutes students were late for their fun Maths lesson in the Autumn Term.

(a) Draw a **Cumulative Frequency Diagram** of the data

(b) Use it to find the **Median**, **Lower Quartile**, **Upper Quartile**, and **Inter Quartile Range**

Time t (mins)	Number of Students	Cumulative Frequency
$0 < t \leq 5$	10	10
$5 < t \leq 10$	16	26
$10 < t \leq 15$	30	56
$15 < t \leq 20$	22	68
$20 < t \leq 25$	2	70
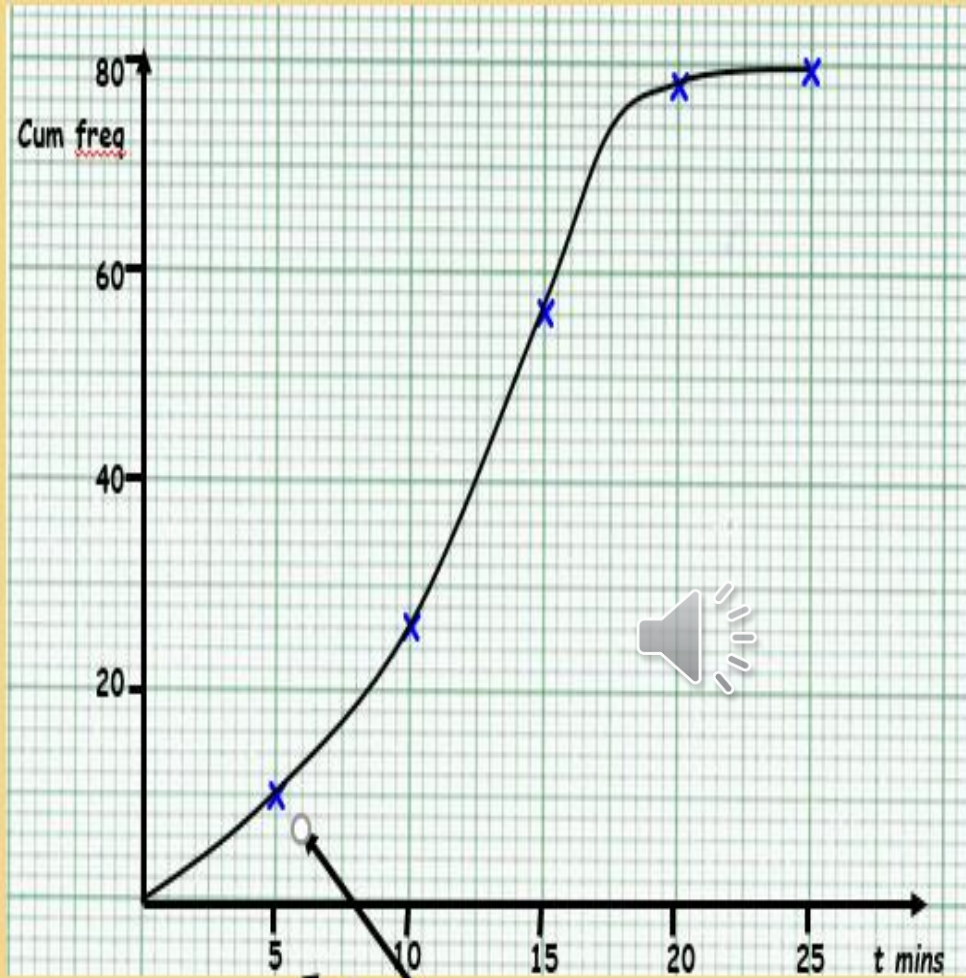
Note you plot at the end point of the interval