Core Mathematics

Transition Booklet

Year 11 to Year 12

What is Core Maths?

Core Maths is a brand new course for those who want to keep up their valuable maths skills but are not planning to take AS or A-level mathematics. At the end of the **one-year course**, you will come out with a level 3 qualification – similar to an AS. The qualification is assessed by final examination.

Why should I study Core Maths?

Core Maths has been designed to maintain and develop real-life maths skills. What you study is not purely theoretical or abstract; it can be applied on a day-to-day basis in work, study or life and most courses will include a financial maths element. It will also help with other A-level subjects – in particular with science, geography, business studies, psychology and economics.

The skills developed in the study of mathematics are increasingly important in the workplace and in higher education; studying Core Maths will help you keep up these essential skills. Most students who study maths after GCSE improve their career choices and increase their earning potential.

Will it be recognised by Universities and employers?

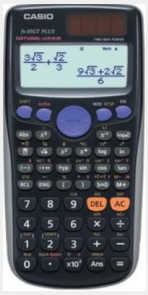
Core Maths is a new course but already several universities have come out in strong support of it. Even subjects like history now recognise the importance of statistics and so a Core Maths qualification will help you hit the ground running at university.

Employers from all different sectors are also firmly behind the Core Maths qualification. Many roles in today's workplace require high levels of budget management and problem-solving skills; Core Maths will be a useful tool in equipping you with these skills.

Why Core Maths?

Only 20 percent of students study maths beyond GCSE in the UK – the lowest rate in leading developed countries in the world; in Japan, this figure is 85 per cent. This puts young people in the UK – you – at a major disadvantage in a global job market. The UK government wants this to change and has put in place a plan to encourage more students to carry on studying maths after GCSE. The aim is to ensure that by 2020, the vast majority of all students in post-16 education continue to study some form of maths.

If you require clarification on any of the above please do not hesitate to contact us.



Calculator
Students will need a calculator suitable for GCSE such as the Casio FX-85gt plus.

Folders
You will need to buy at least one A4 Lever arch ring binder folders to carry you through the one year course. These are available from any stationary store and it is important they are kept in a presentable order for your own revision. In September, you will be given a folder checklist so that you know what to keep in your folder.

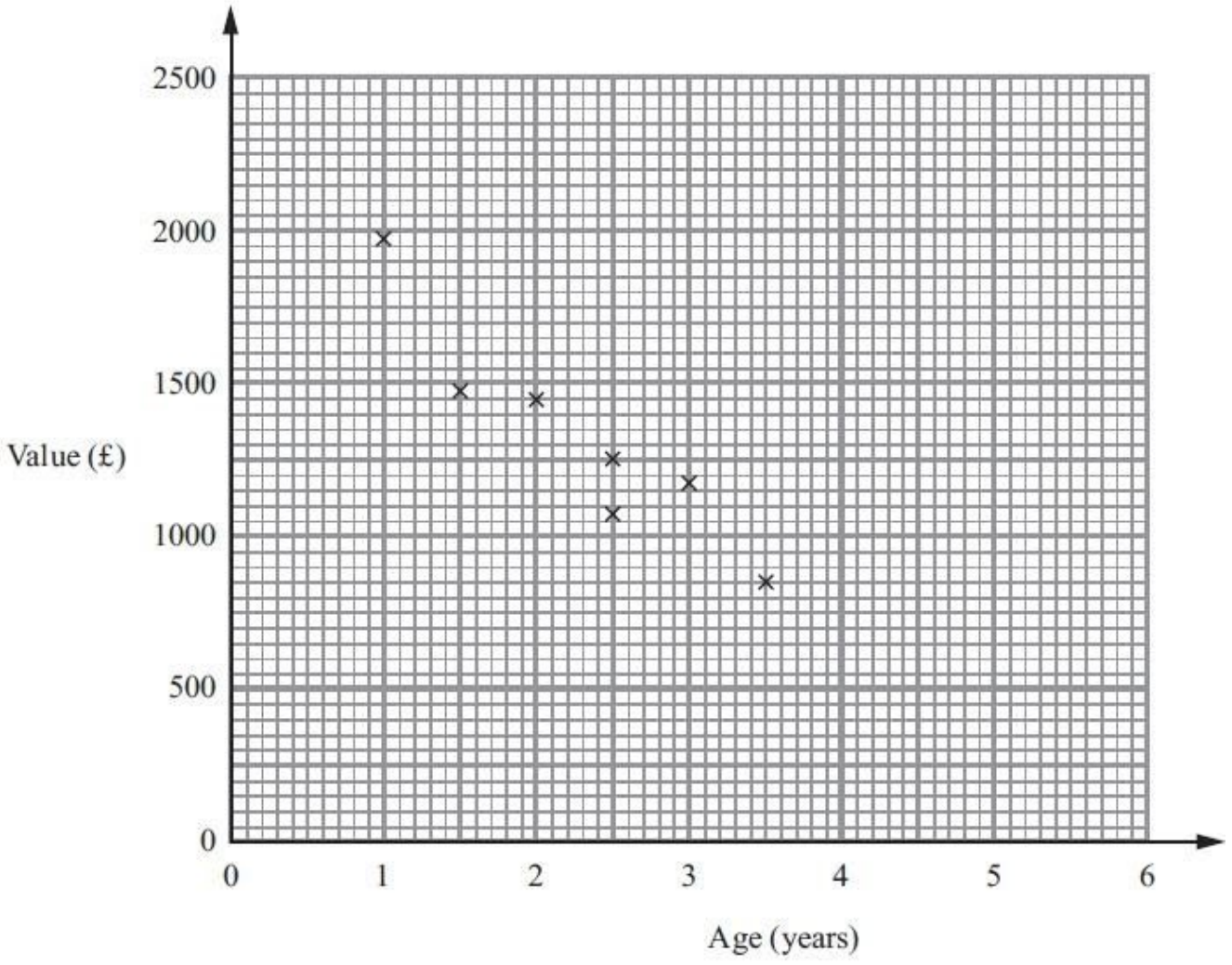
Core Mathematics Summer Tasks

1. Have all equipment listed above ready.
2. Complete the Summer Work exercises from this booklet. These are not optional and you should keep your solutions in your folder. Each topic has a link to a video to go over them. Watch the video before attempting the questions.

- Boxplots
- Cumulative frequency
- Scatter graphs
- Random Sampling
- Venn Diagrams
- Probability Tree Diagrams
- Frequency Tree Diagrams
- Probability of equally likely outcomes
- Mean from a table
- Simultaneous equations
- Solve inequalities
- Substitution
- nth term of a sequence
- Plotting straight line graphs
- Percentage change
- Conversion graphs

Questions

Q1.
The scatter graph shows information about the ages and values of seven Varley motor scooters.



Another Varley motor scooter is 5 years old.
It has a value of £300

(a) Show this information on the scatter graph. **(1)**

(b) Describe the relationship between the age and the value of Varley motor scooters.

.....
.....

(1)

A Varley motor scooter is 4 years old.

(c) Estimate its value. £ . . . . . .

(2)

(Total for Question is 4 marks)

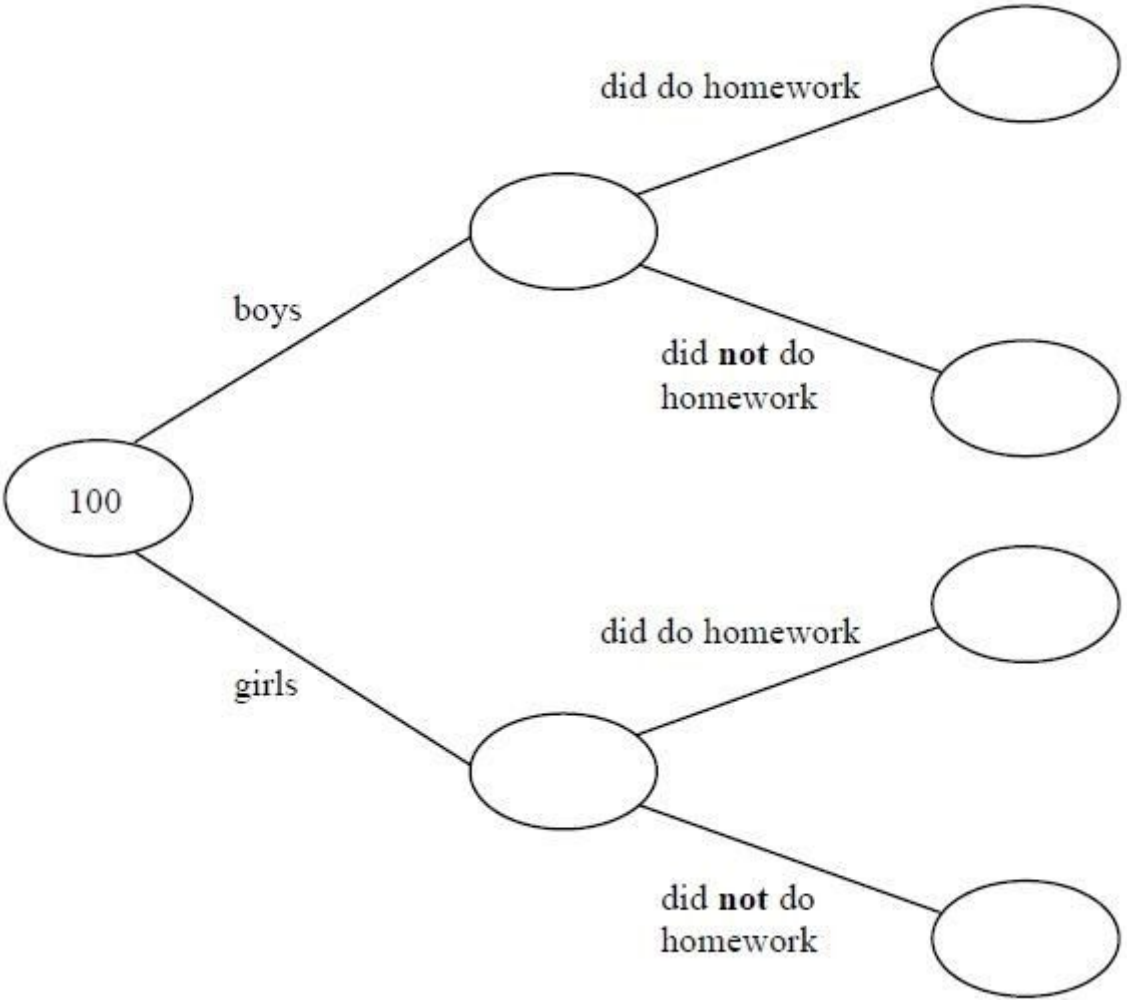
Q2.

100 students had some homework.

42 of these students are boys.
8 of the 100 students did **not** do their homework.
53 of the girls did do their homework.

(a) Use this information to complete the frequency tree.

(3)



One of the girls is chosen at random.

(b) Work out the probability that this girl did **not** do her homework.

.....**(2)**

(Total for question = 5 marks)

Q3.

$\mathscr{E} = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$
$A = \{\text{multiples of } 2\}$
$A \cap B = \{2, 6\}$
$A \cup B = \{1, 2, 3, 4, 6, 8, 9, 10\}$

Draw a Venn diagram for this information.

(Total for question is 4 marks)

Q4.

Jenny works in a shop that sells belts.

The table shows information about the waist sizes of 50 customers who bought belts from the shop in May.

Belt size	Waist (w inches)	Frequency
Small	$28 < w \leqslant 32$	24
Medium	$32 < w \leqslant 36$	12
Large	$36 < w \leqslant 40$	8
Extra Large	$40 < w \leqslant 44$	6

(a) Calculate an estimate for the mean waist size.

..... inches **(3)**

Belts are made in sizes Small, Medium, Large and Extra Large.

Jenny needs to order more belts in June.
The modal size of belts sold is Small.

Jenny is going to order $\frac{3}{4}$ of the belts in size Small.

The manager of the shop tells Jenny she should **not** order so many Small belts.

(b) Who is correct, Jenny or the manager?
You must give a reason for your answer.

.....

.....

(2)

(Total for question is 5 marks)

Q5.

Sue has a bag of 18 sweets.

5 of the sweets are blue
7 of the sweets are red
6 of the sweets are green

Sue takes at random a sweet from the bag.

Write down the probability that Sue

(i) takes a red sweet,

.....

(ii) does **not** take a green sweet,

.....

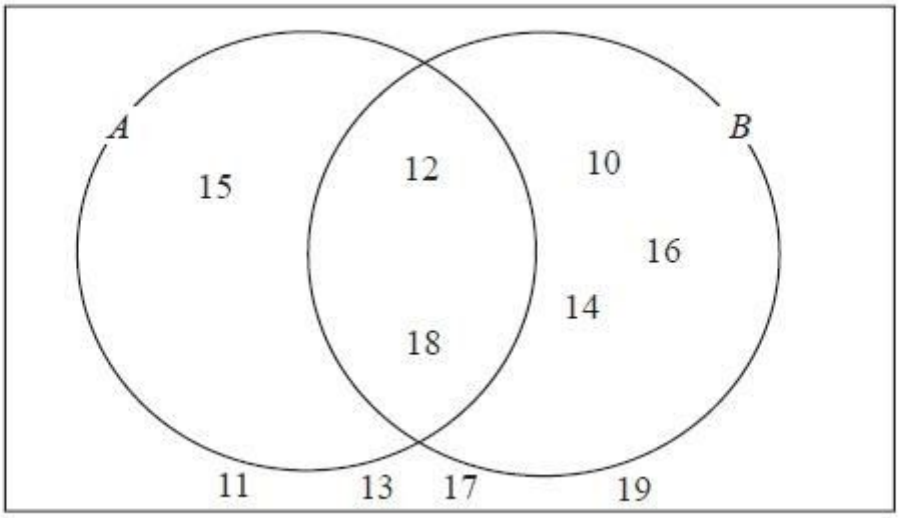
(iii) takes a yellow sweet.

.....

(Total for Question is 3 marks)

Q6.

Here is a Venn diagram.



(a) Write down the numbers that are in set

(i) $A \cup B$

.....

(ii) $A \cap B$

.....

(2)

One of the numbers in the diagram is chosen at random.

(b) Find the probability that the number is in set A'

.....

(2)

(Total for question = 4 marks)

Q7.

Sue works for a company that delivers parcels.

One day the company delivered 80 parcels.
The table shows information about the weights, in kg, of these parcels.

Weight (w kg)	Frequency
$0 < w \leqslant 1$	19
$1 < w \leqslant 2$	17
$2 < w \leqslant 3$	15
$3 < w \leqslant 4$	12
$4 < w \leqslant 5$	10
$5 < w \leqslant 6$	7

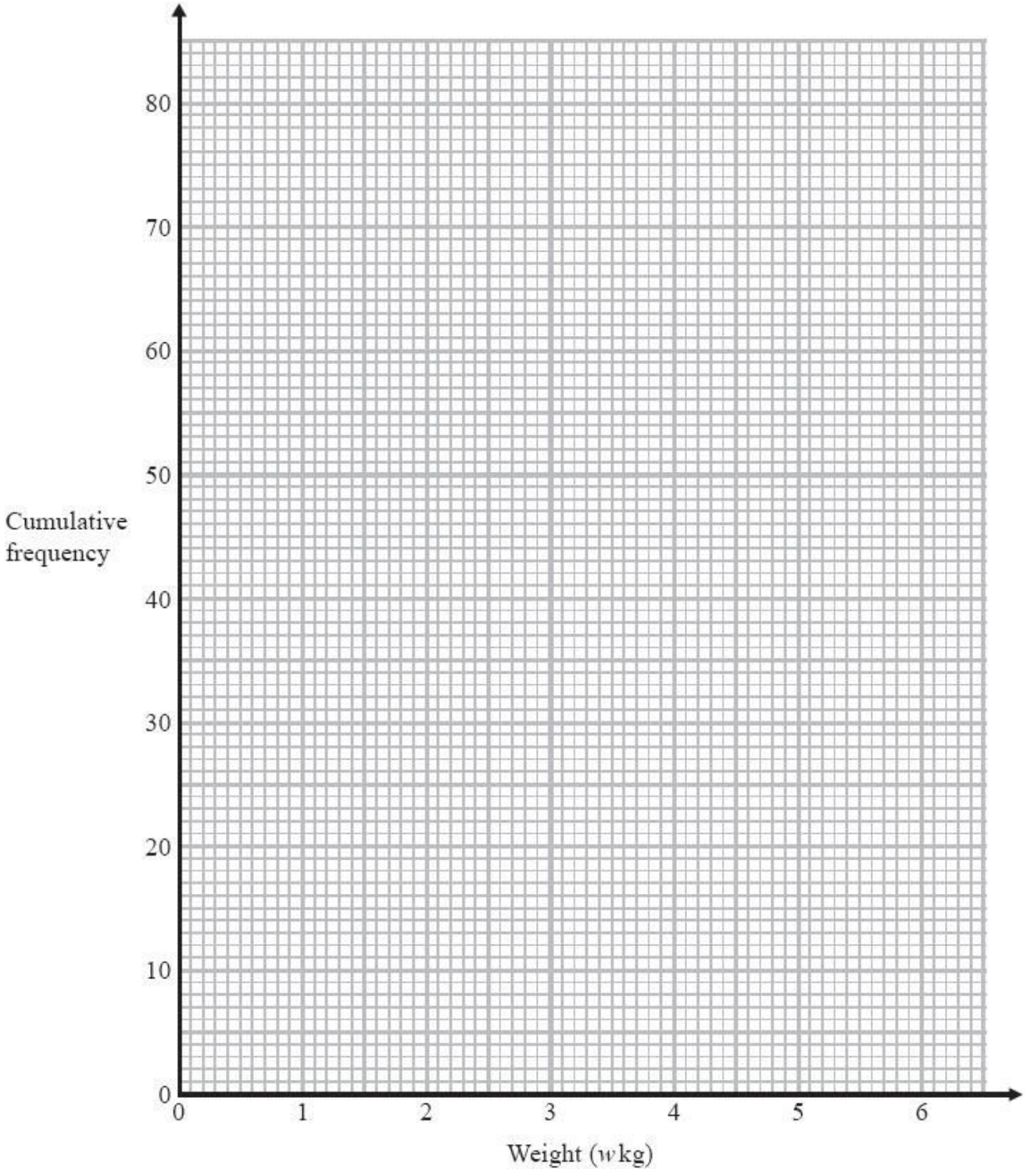
(a) Complete the cumulative frequency table.

Weight (w kg)	Cumulative frequency
$0 < w \leqslant 1$	
$0 < w \leqslant 2$	
$0 < w \leqslant 3$	
$0 < w \leqslant 4$	
$0 < w \leqslant 5$	
$0 < w \leqslant 6$	

(1)

(b) On the grid opposite, draw a cumulative frequency graph for your table.

(2)



Sue says,

"75 % of the parcels weigh less than 3.4 kg."

*(c) Is Sue correct?

You must show how you get your answer.

(3)

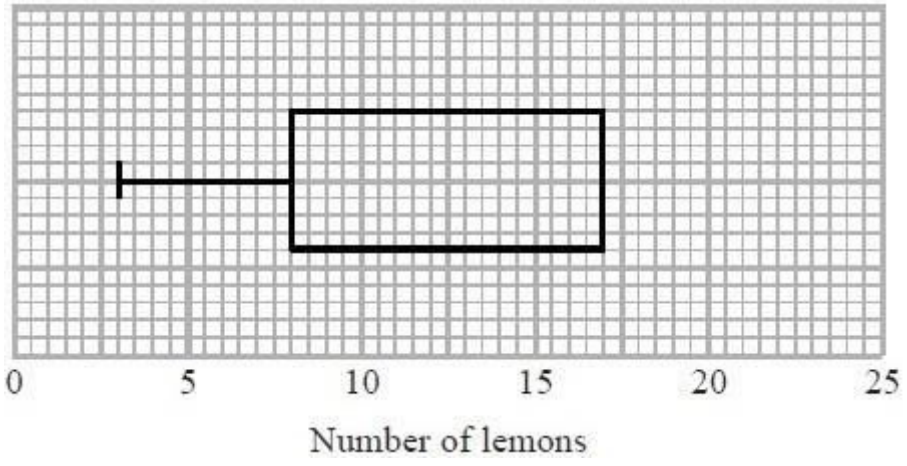
(Total for question = 6 marks)

Q8.

Presta recorded the number of lemons on each of 60 lemon trees.

The incomplete table and box plot give information about her results.

	Number of lemons
Smallest number	
Lower quartile	8
Median	11
Upper quartile	
Greatest number	22



(a) (i) Use the information in the table to complete the box plot.

(ii) Use the information in the box plot to complete the table.

(3)

Some of these 60 lemon trees have 8 or more lemons on them.

(b) Find an estimate for the number of lemon trees with 8 or more lemons on them.

.....

(2)

(Total for Question is 5 marks)

Q9.

$-5 < y \leq 0$

y is an integer.

(a) Write down all the possible values of y.

.....

(2)

(b) Solve $6(x - 2) > 15$

.....

(2)

(Total for Question is 4 marks)

Q10.

Here are the first five terms of an arithmetic sequence.

4 9 14 19 24

(a) Find, in terms of n, an expression for the nth term of this sequence.

.....

(2)

Here are the first five terms of a different sequence.

2 2 0 −4 −10

An expression for the nth term of this sequence is $3n - n^2$

(b) Write down, in terms of n, an expression for the nth term of a sequence whose first five terms are

4 4 0 −8 −20

.....

(1)

(Total for Question is 3 marks)

Q11.

Solve the simultaneous equations

$$4x + 2y = 7$$
$$3x - 5y = -24$$

x = ...

y = ...

(Total for question = 4 marks)