Write your name here

Surname	Other names

In the style of:

Edexcel GCSE

Centre Number	Candidate Number

Mathematics A

Cumulative Frequency

Higher Tier

Past Paper Style Questions
Arranged by Topic

Paper Reference
1MA0/1H

You must have: Ruler graduated in centimetres and millimetres, protractor, pair of compasses, pen, HB pencil, eraser. Tracing paper may be used.

Total Marks

Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided
  – *there may be more space than you need.*
- **Calculators must not be used.**

Information

- The total mark for this paper is 100
- The marks for **each** question are shown in brackets
  – *use this as a guide as to how much time to spend on each question.*
- Questions labelled with an **asterisk** (*) are ones where the quality of your written communication will be assessed.

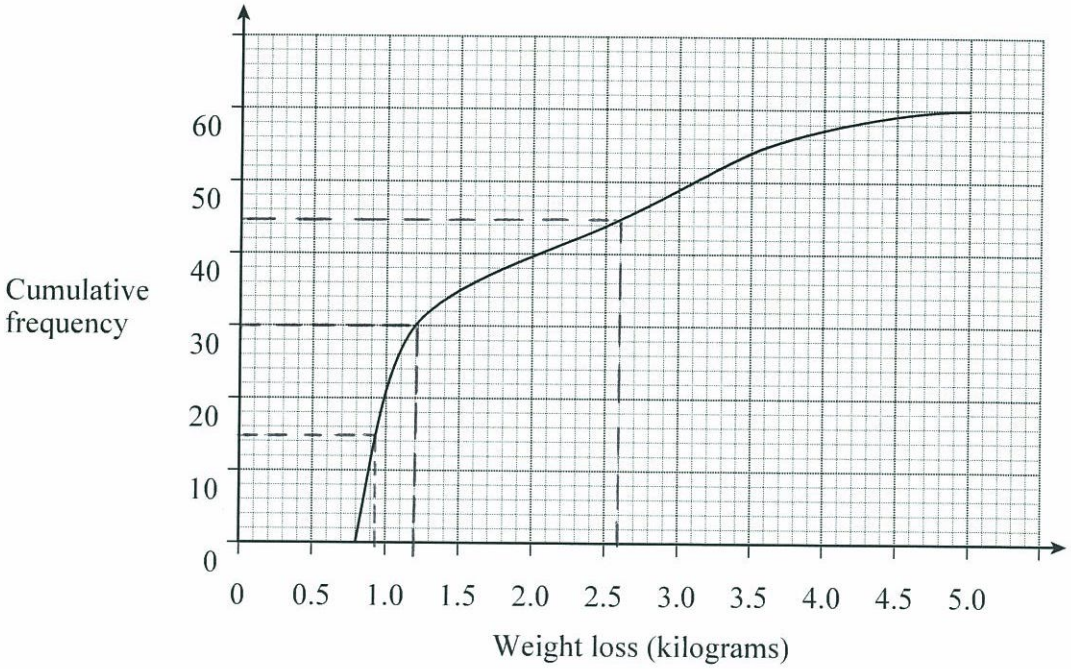
Advice

- Read each question carefully before you start to answer it.
- Keep an eye on the time.
- Try to answer every question.
- Check your answers if you have time at the end.

Turn over ▶

1. Two groups of people are trying to lose weight.

(a) Group A join a gym.
The graph shows information about their weight loss after one month.



(i) How many people are in group A?

60

(1)

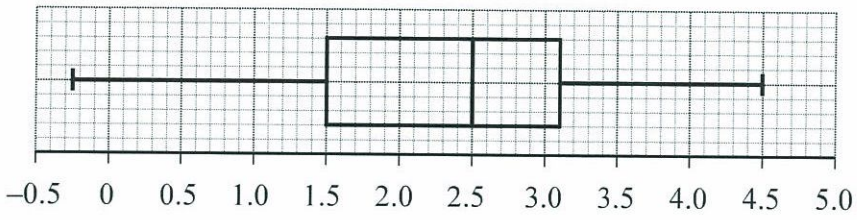
(ii) Does everyone in group A lose weight?
Write down how you decide.

Yes - the graph suggests that the minimum weight loss was no less than 0.8 kg.

(1)

(b) Group B follow a diet.

The box plot shows information about their weight loss after one month



Does everyone in group B lose weight? Write down how you decide.

No – the minimum weight loss was -0.25kg which suggests a weight gain of 0.25kg **(1)**

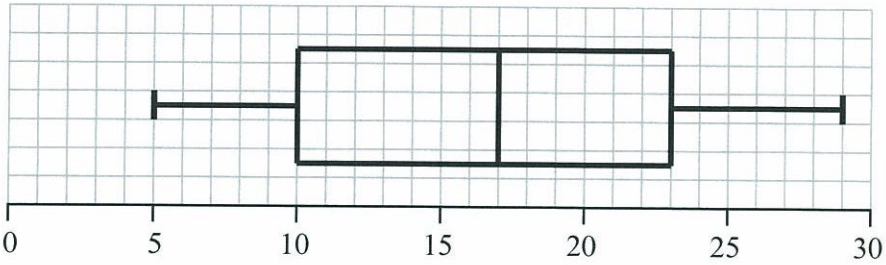
(c) Compare the weight loss of group A with group B.

	Group A	Group B
Median	1.2	2.5
Minimum	0.8	-0.25
Maximum	5	4.5
Range	4.2	4.75
Lower Quartile	0.9	1.5
Upper Quartile	2.6	3.1
Interquartile Range	1.7	1.6

The median weight loss for Group B was 1.3kg greater than that of Group A. Also, weight loss for Gp B was more widely dispersed and thus less consistent than Group A's weight loss. **(5)**

(Total 8 marks)

2. The box plot gives information about the distribution of the weights of bags on a plane.



(a) Georgina says the lightest bag weighs 10 kg.

She is **wrong**.
Explain why.

10kg represents the lower quartile. The lightest bag weighs 5 kg.

(1)

(b) Write down the median weight.

17 kg

(1)

(c) Work out the interquartile range of the weights.

I.Q. Range = U.Q − L.Q
= 23 − 10 = 13kg

13 kg

(1)

There are 240 bags on the plane.

(d) Work out the number of bags with a weight of 23 kg or more.

U.Q (or 75th percentile) = 23 kg.

⇒ 25% of the distribution weigh 23 kg or more.

25% of 240 = $\frac{25}{100} \times 240$

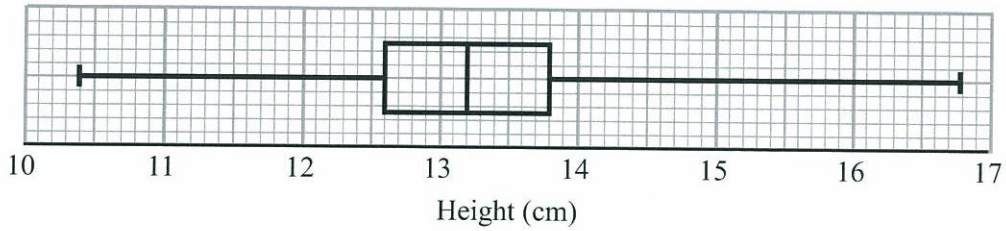
= $\frac{1}{4} \times 240 = 60$

60

(2)

(Total 5 marks)

3. David measured the height, in cm, of each tomato plant in his greenhouse.
He used the results to draw the box plot shown below.



(a) Write down the median height.

13.2 ..... cm
(1)

(b) Work out the interquartile range.

13.8 − 12.6 = 1.2 cm

1.2 ..... cm
(2)

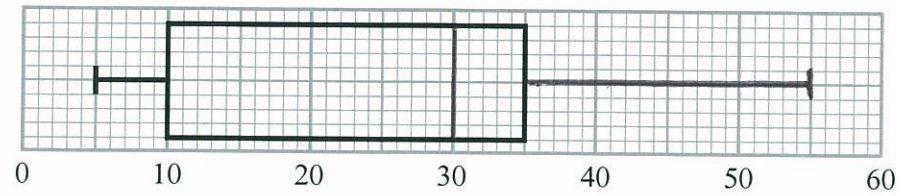
(c) Explain why the interquartile range may be a better measure of spread than the range.

The I.Q range will often provide a more reliable measure of dispersion free from the distorting effect of anomalous extremes/outliers.

(1)

(Total 4 marks)

4. The incomplete box plot and table show some information about some marks.



	Mark
Lowest mark	5
Lower quartile	10
Median	30
Upper quartile	35
Highest mark	55

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

(2)

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

(1)

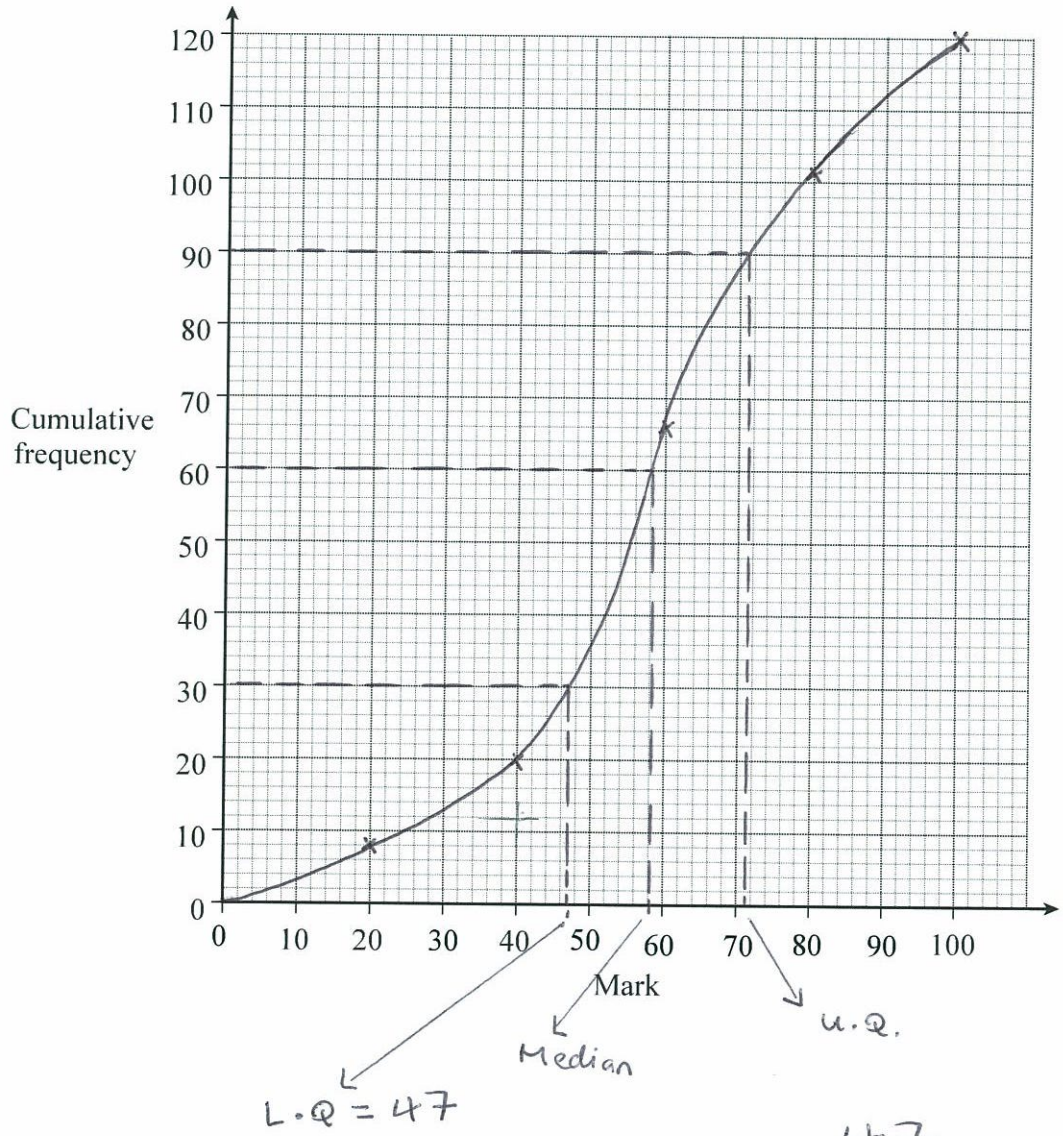
(Total 3 marks)

5. The table shows a summary of the marks scored by 120 people in a test.

Mark	Frequency	Cumulative Frequency
$0 < \text{mark} \leqslant 20$	8	8
$20 < \text{mark} \leqslant 40$	12	20
$40 < \text{mark} \leqslant 60$	46	66
$60 < \text{mark} \leqslant 80$	35	101
$80 < \text{mark} \leqslant 100$	19	120

(a) Three-quarters of the people pass the test.

Use a cumulative frequency graph to estimate the pass mark.



47

$\frac{3}{4}$ of the people achieved approximately 47 marks or more. **(5)**

(b) Here is the table again.

Mark	Frequency
$0 < \text{mark} \leqslant 20$	8
$20 < \text{mark} \leqslant 40$	12
$40 < \text{mark} \leqslant 60$	46
$60 < \text{mark} \leqslant 80$	35
$80 < \text{mark} \leqslant 100$	19

Two of these 120 people are chosen at random.

(i) Work out the probability that both scored **over** 60.

$$\frac{54}{120} \times \frac{53}{119} = \frac{2862}{14280} = \frac{1431}{7140} = \frac{477}{2380}$$

54 × 53: 162 + 2700 = 2862

120 × 119: 1080 + 1200 + 12000 = 14280

$\frac{477}{2380}$

(2)

(ii) Work out the probability that one scored **over** 80 and the other scored 80 or **under**.

$$P([>80 \text{ AND } \leqslant 80] \text{ OR } [\leqslant 80 \text{ AND } > 80])$$

$$= \frac{19}{120}\left(\frac{101}{119}\right) + \frac{101}{120}\left(\frac{19}{119}\right)$$

$$= \frac{1919}{14280} + \frac{1919}{14280}$$

$$= \frac{3838}{14280} = \frac{1919}{7140}$$

$\frac{1919}{7140}$

(3)

(Total 10 marks)

6. Georgina did a survey about the amounts of money spent by 120 families during summer holidays.

The cumulative frequency table gives some information about the amounts of money spent by the 120 families.

Amount (£A) spent	Cumulative frequency
$0 \leqslant A < 100$	13
$0 \leqslant A < 150$	25
$0 \leqslant A < 200$	42
$0 \leqslant A < 250$	64
$0 \leqslant A < 300$	93
$0 \leqslant A < 350$	110
$0 \leqslant A < 400$	120

(a) On the grid, draw a cumulative frequency diagram.

(2)

(b) Use your cumulative frequency diagram to estimate the median.

£ 240

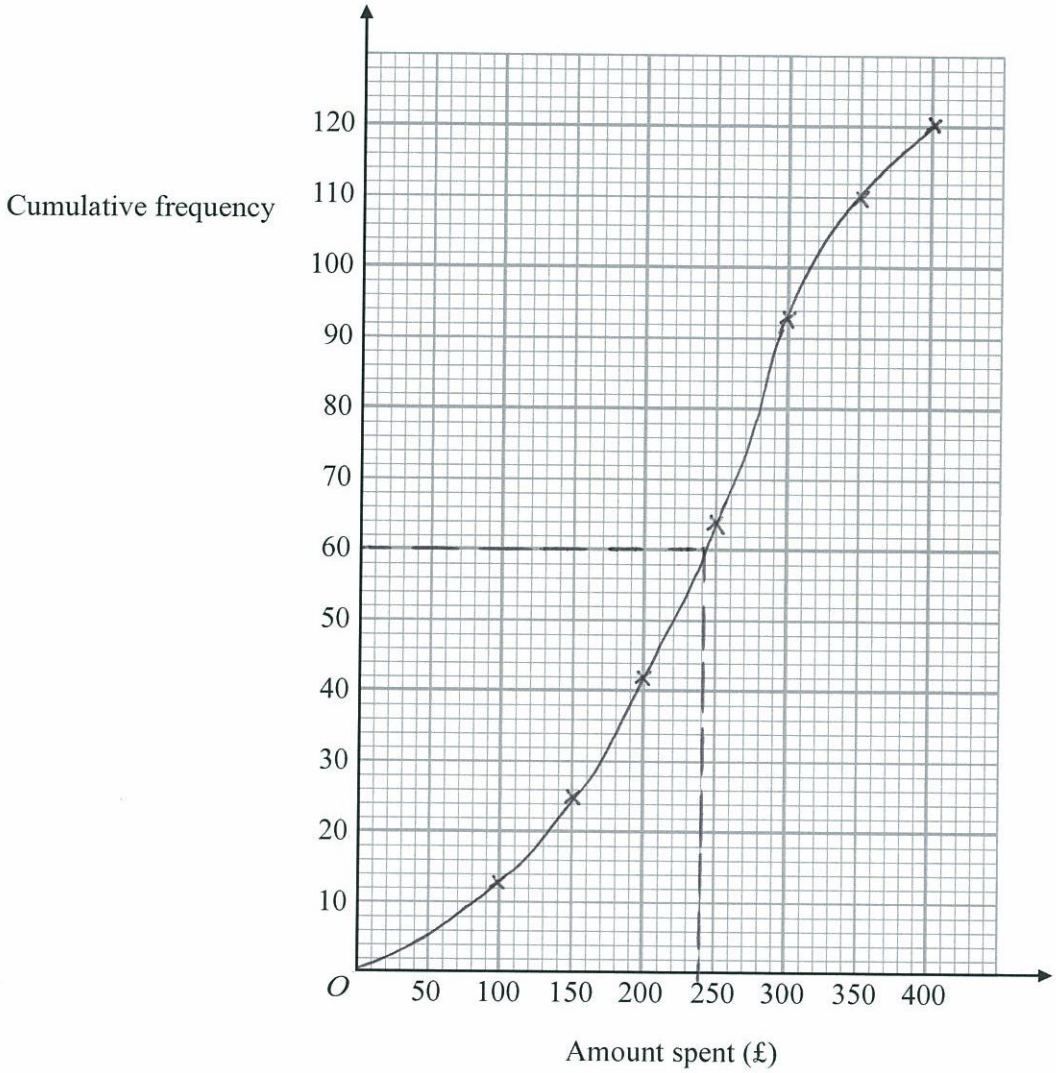
(2)

A survey of the amounts of money spent by 200 families during their Christmas holidays gave a median of £305

(c) Compare the amounts of money spent at Christmas with the amounts of money spent in summer.

More money was spent on average at Christmas than during the summer holidays.

(1)



(Total 5 marks)

7. The table shows information about the number of felt tip pens in 100 childrens pencil cases.

Number of pens	Frequency
$0 < n \leqslant 20$	18
$20 < n \leqslant 40$	22
$40 < n \leqslant 60$	35
$60 < n \leqslant 80$	15
$80 < n \leqslant 100$	8
$100 < n \leqslant 120$	2

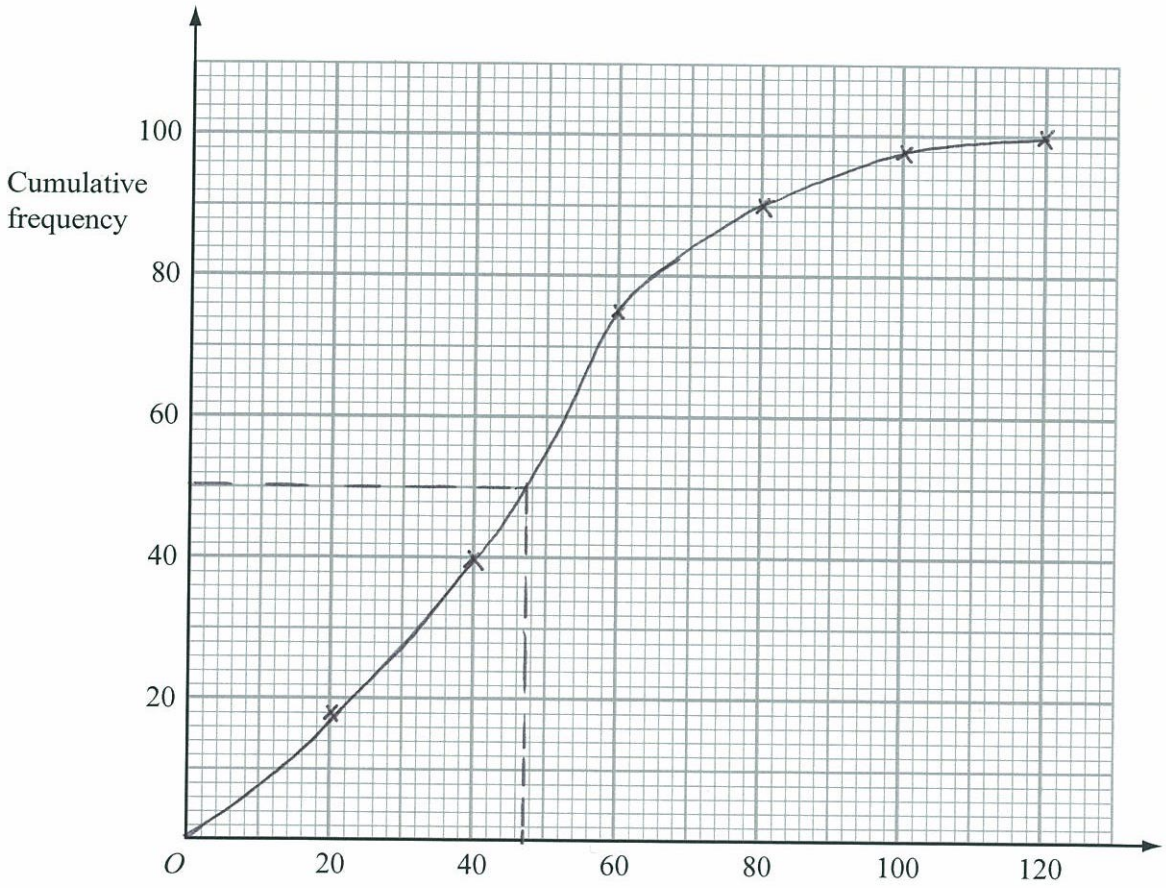
(a) Complete the cumulative frequency table for this information.

Number of pens	Cumulative frequency
$0 < n \leqslant 20$	18
$0 < n \leqslant 40$	40
$0 < n \leqslant 60$	75
$0 < n \leqslant 80$	90
$0 < n \leqslant 100$	98
$0 < n \leqslant 120$	100

(1)

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

(2)



(c) Use your graph to find an estimate for the median number of pens.

47

.....

(1)

(Total 4 marks)

8. A company tested 100 batteries.

The table shows information about the number of hours that the batteries lasted.

Time (t hours)	Frequency
$50 \leqslant t < 55$	12
$55 \leqslant t < 60$	21
$60 \leqslant t < 65$	36
$65 \leqslant t < 70$	23
$70 \leqslant t < 75$	8

(a) Complete the cumulative frequency table for this information.

(1)

Time (t hours)	Cumulative frequency
$50 \leqslant t < 55$	12
$50 \leqslant t < 60$	33
$50 \leqslant t < 65$	69
$50 \leqslant t < 70$	92
$50 \leqslant t < 75$	100

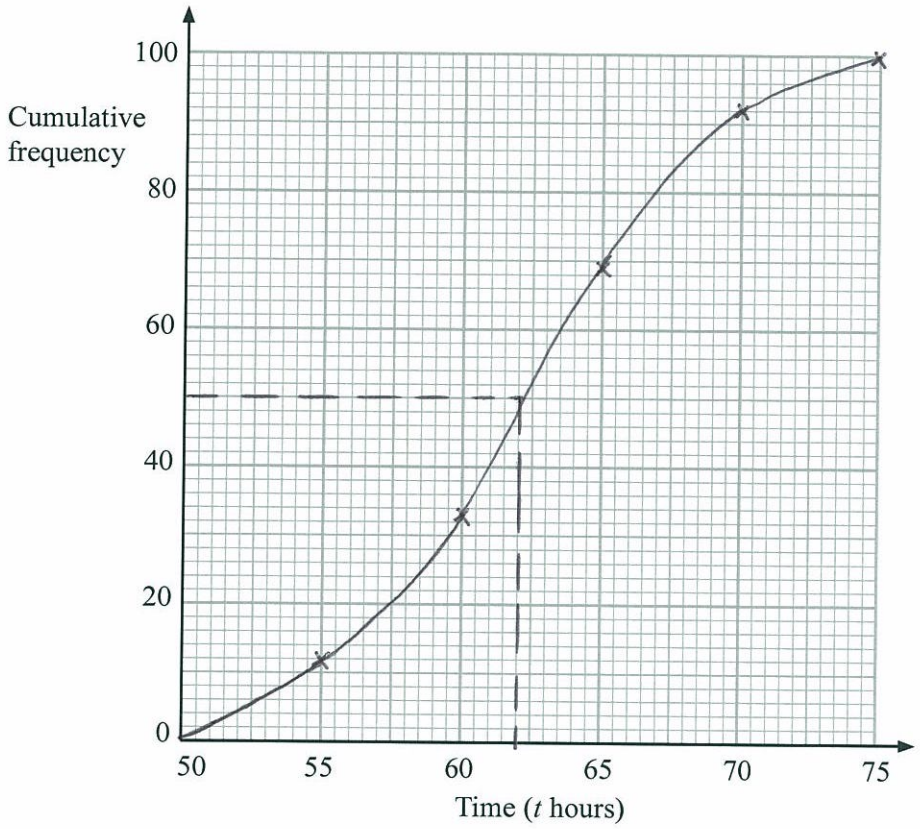
(b) On the grid, draw a cumulative frequency graph for your completed table.

(2)

(c) Use your completed graph to find an estimate for the median time.
You must state the units of your answer.

62 hours

(2)



(Total 5 marks)

9. The table gives some information about the number of fish caught in a match.

Number of fish	Frequency
$0 < n \leqslant 20$	16
$20 < n \leqslant 30$	26
$30 < n \leqslant 40$	23
$40 < n \leqslant 50$	10
$50 < n \leqslant 60$	5

(a) Write down the modal class interval.

$20 < n \leqslant 30$

(1)

(b) Complete the cumulative frequency table.

Number of fish	Cumulative Frequency
$0 < n \leqslant 20$	16
$0 < n \leqslant 30$	42
$0 < n \leqslant 40$	65
$0 < n \leqslant 50$	75
$0 < n \leqslant 60$	80

(1)

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

(2)

(d) Use your graph to find an estimate for

(i) the median number of fish,

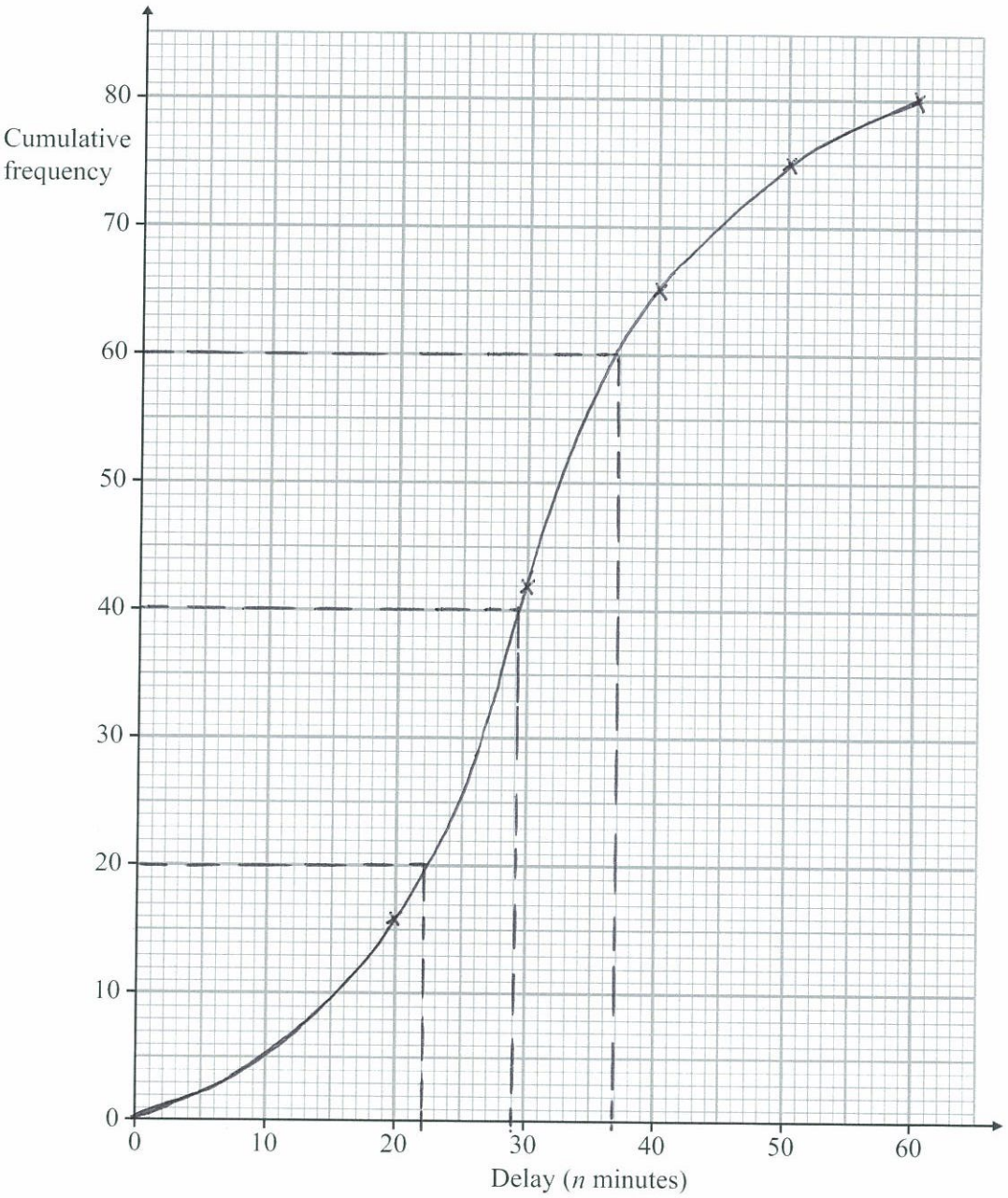
29 fish ~~minutes~~

(ii) the interquartile range of the number of fish.

U.Q − L.Q = 37 − 22

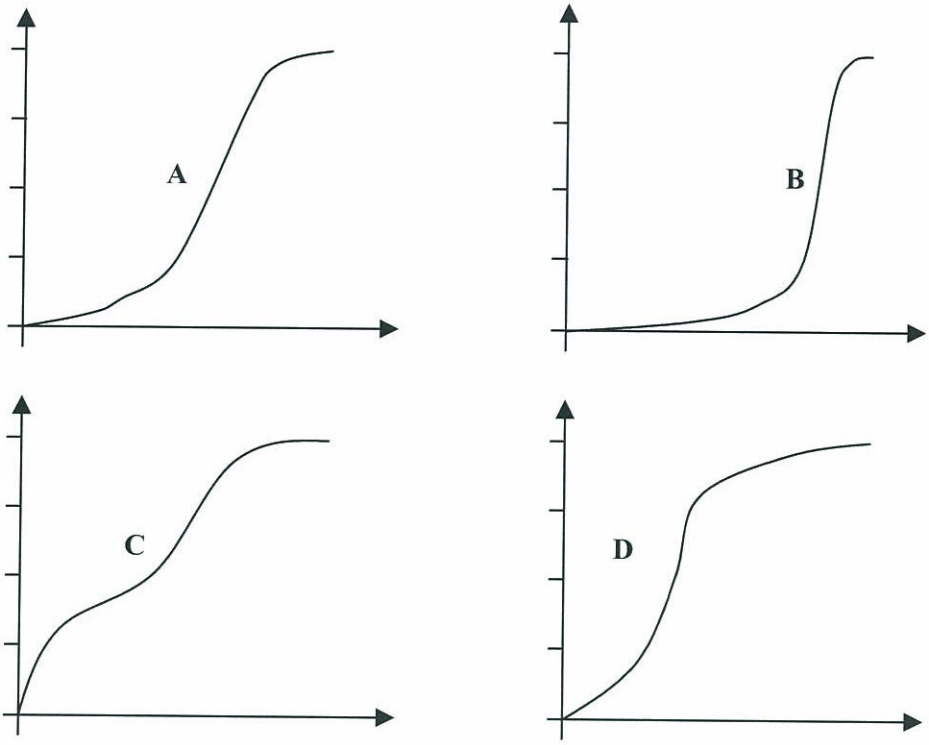
15 fish ~~minutes~~

(3)

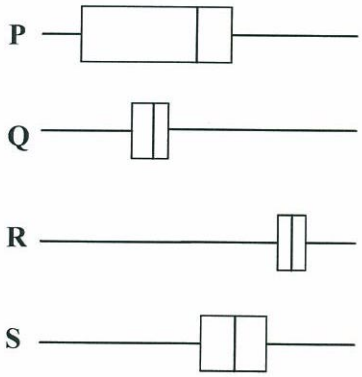


(Total 7 marks)

10. Here are four cumulative frequency diagrams.



Here are four box plots.



Smallest L.Q => C

Second smallest L.Q and small I.Q.Range (i.e. steep middle section) with highly dispersed last 25% (i.e. shallow gradient) => D

Biggest L.Q. value => B

For each box plot, write down the letter of the appropriate cumulative frequency diagram.

P and ..... C .....

Q and ..... D .....

R and ..... B .....

S and ..... A .....

(Total 2 marks)

11. The table shows information about the ~~time~~ length, m millimetres, of 120 tomato plants grow in a week.

~~Time~~ Length (m millimetres)	Frequency
$70 < m \leqslant 80$	4
$80 < m \leqslant 90$	12
$90 < m \leqslant 100$	34
$100 < m \leqslant 110$	32
$110 < m \leqslant 120$	26
$120 < m \leqslant 130$	12

(a) Write down the modal class interval.

$90 < m \leqslant 100$

.....

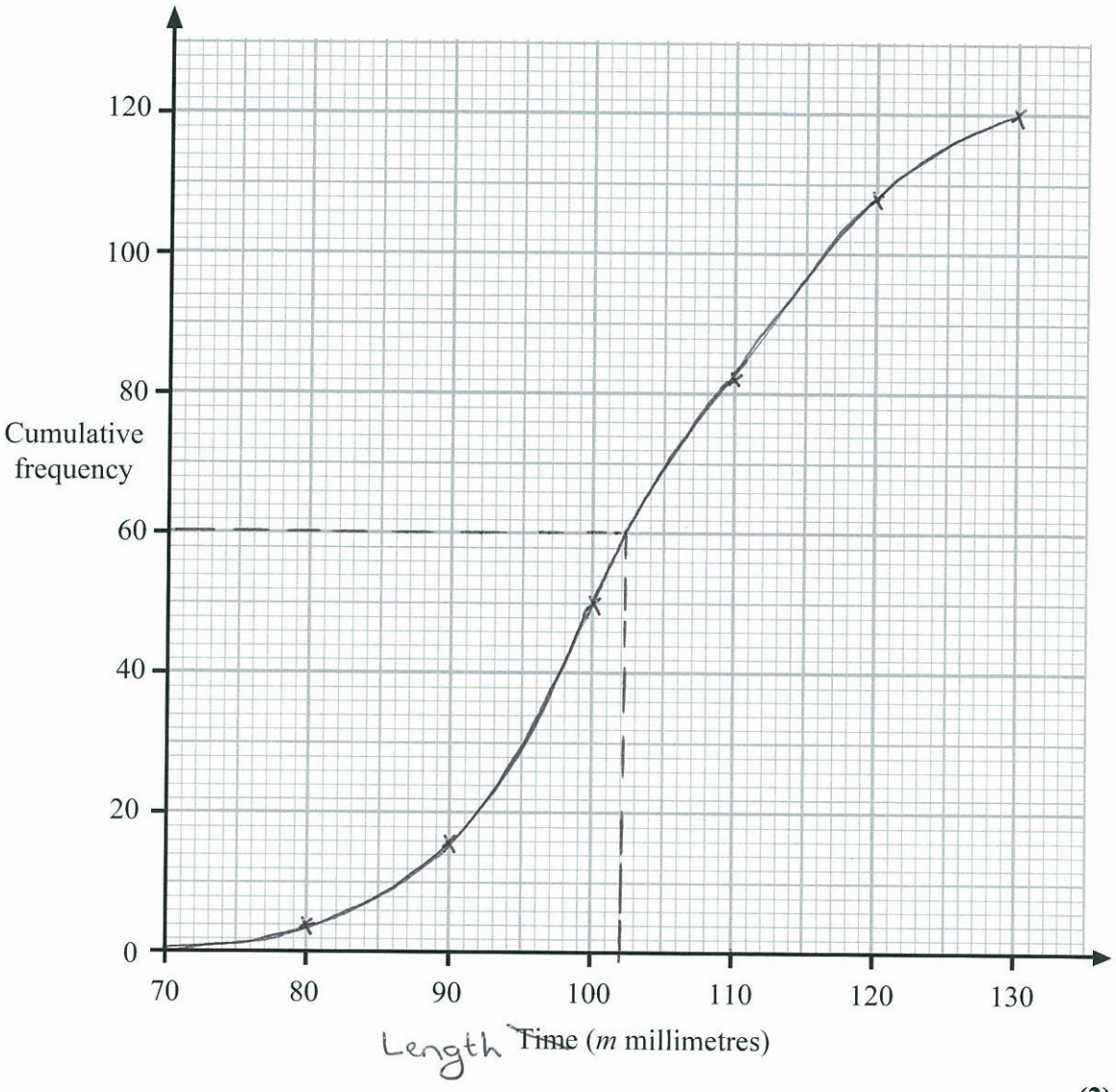
(1)

(b) Complete the cumulative frequency table.

~~Time~~ Length (m millimetres)	Cumulative frequency
$70 < m \leqslant 80$	4
$70 < m \leqslant 90$	16
$70 < m \leqslant 100$	50
$70 < m \leqslant 110$	82
$70 < m \leqslant 120$	108
$70 < m \leqslant 130$	120

(1)

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



(2)

(d) Use your graph to find an estimate for the median.

102 mm
..... ~~minutes~~

(1)

(Total 5 marks)

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