

One Variable Statistics

1. The mean of the ten numbers listed below is 5.5.

1, 3, a, 8, 7, 3, 9, 5, 8, 3

- (a) Find the value of a .
- (b) Find the median of these numbers.

Working:

$$\frac{50 + a}{10} = 5.5$$

$$50 + a = 55$$

$$a = 5$$

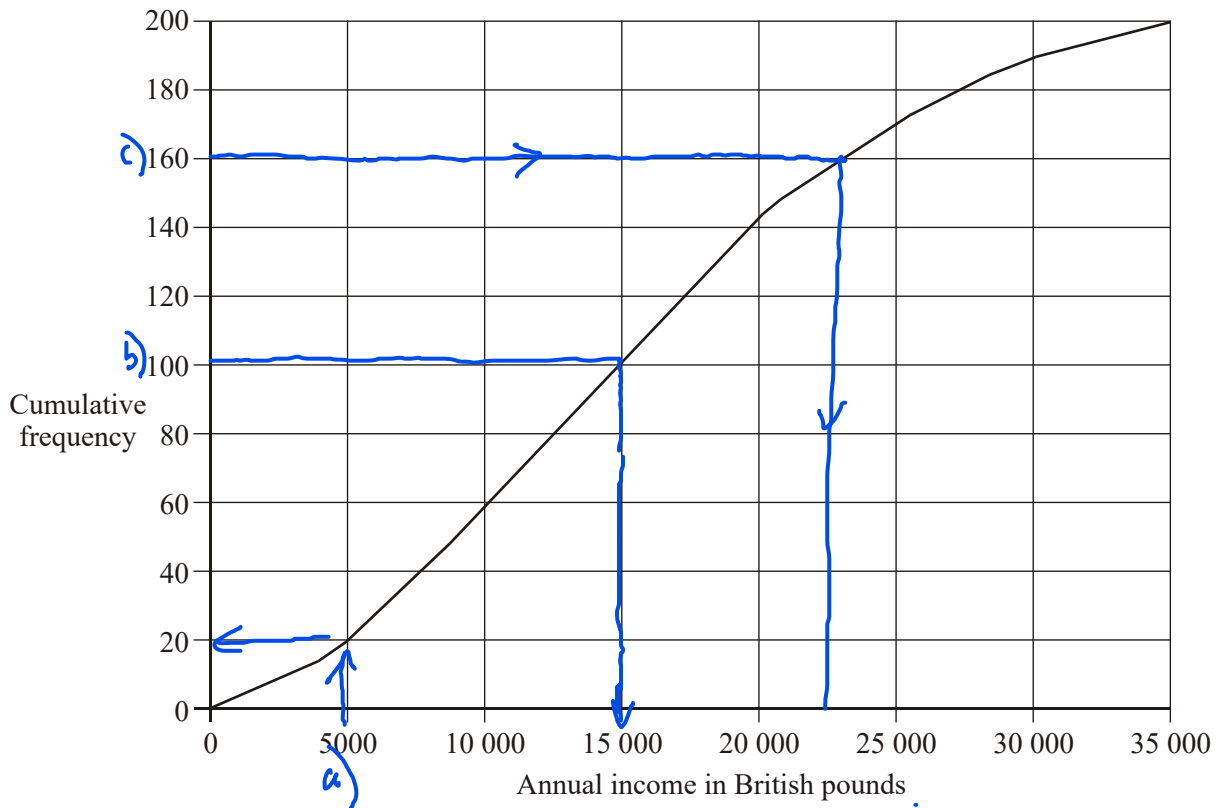
3 3 3 4 5 5 7 8 8 9
↑
Med

Answers:

- (a) *a = 5*
- (b) *Med = 5*

(Total 4 marks)

2. The graph below shows the cumulative frequency for the yearly incomes of 200 people.



Use the graph to estimate

- (a) the number of people who earn less than 5000 British pounds per year;
- (b) the median salary of the group of 200 people;
- (c) the lowest income of the richest 20% of this group. 20% of 200 ppl = 40 ppl.

Working:

Answers:

(a) 20

(b) 15 000

(c) 23 000

(Total 4 marks)

3. A marine biologist records as a frequency distribution the lengths (L), measured to the nearest centimetre, of 100 mackerel. The results are given in the table below.

Length of mackerel (L cm)	Number of mackerel
$27 < L \leq 29$	2
$29 < L \leq 31$	4
$31 < L \leq 33$	8
$33 < L \leq 35$	21
$35 < L \leq 37$	30
$37 < L \leq 39$	18
$39 < L \leq 41$	12
$41 < L \leq 43$	5
100	

c.f.

2
6
14
35
65
83
95
100

- (a) Construct a cumulative frequency table for the data in the table. (2)

- (b) Draw a cumulative frequency curve. (Graph Paper)

Hint: Plot your cumulative frequencies at the top of each interval. (3)

(c) Use the cumulative frequency curve to find an estimate, to the nearest cm for

(i) the median length of mackerel; 36 cm (2)

(ii) the interquartile range of mackerel length. 4 cm (2)

(Total 9 marks)

4. The weight in kilograms of 12 students in a class are as follows.

63 76 99 65 63 51 52 95 63 71 65 83

(a) State the mode. 63 (1)

(b) Calculate GDC

(i) the mean weight; 70.5

(ii) the standard deviation of the weights. 14.6 (2)

When one student leaves the class, the mean weight of the remaining 11 students becomes 70 kg.

(c) Find the weight of the student who left.

old Total Wt = 846 (2)
New Total Wt = $11 \times 70 = 770 \Rightarrow$ student weighs 76 kg (Total 5 marks)

5. The heights of 200 students are recorded in the following table.

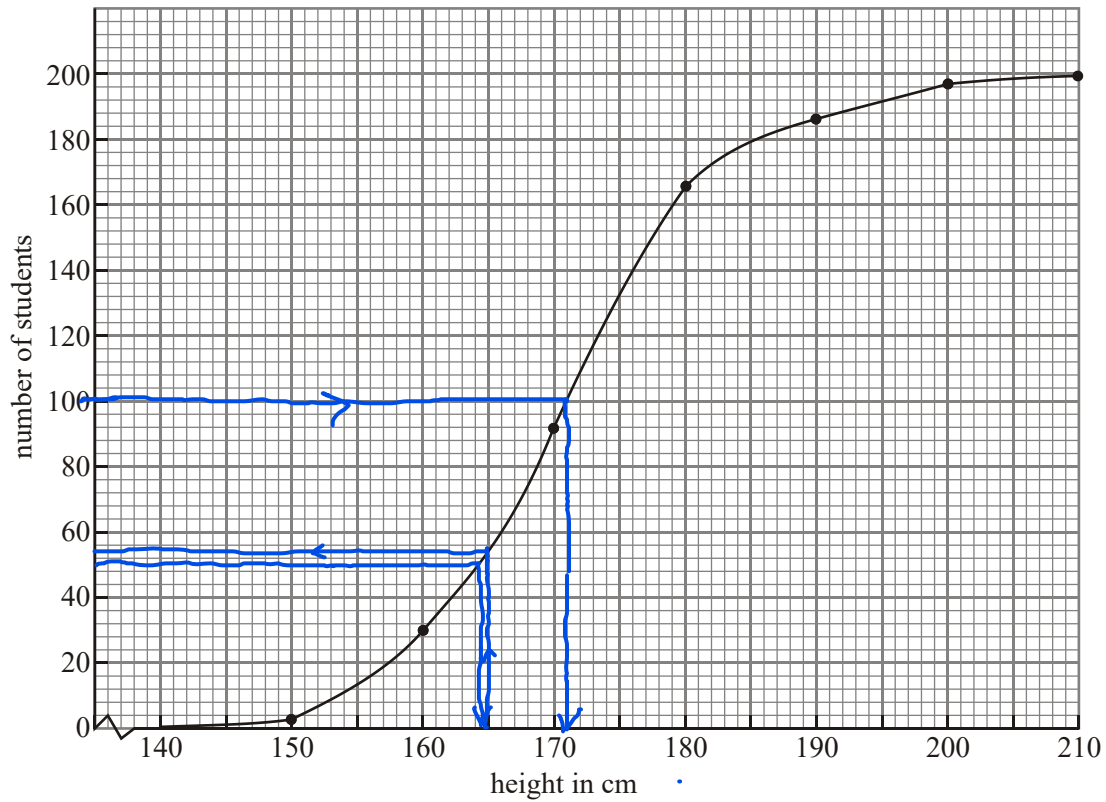
Height (h) in cm	Frequency
$140 \leq h < 150$	2
$150 \leq h < 160$	28
$160 \leq h < 170$	63
$170 \leq h < 180$	74
$180 \leq h < 190$	20
$190 \leq h < 200$	11
$200 \leq h < 210$	2

(a) Write down the modal group. $170 \leq h < 180$ (1)

(b) Calculate an estimate of the mean and standard deviation of the heights. (4)

GDC $\bar{x} = 171$ $\sigma = 11.1$

The cumulative frequency curve for this data is drawn below.



(c) Write down the median height.

171

(1)

(d) The upper quartile is 177.3 cm. Calculate the interquartile range.

$$LQ = 164.5 \Rightarrow IQR = 12.8$$

(2)

(e) Find the percentage of students with heights less than 165 cm.

$$\frac{54}{200} = 27\%$$

(2)

(Total 10 marks)

6. The age in months at which a child first starts to walk is observed for a random group of children from a town in Brazil. The results are

14.3, 11.6, 12.2, 14.0, 20.4, 13.4, 12.9, 11.7, 13.1.

(a) (i) Find the mean of the ages of these children.

GDC
13.7

(ii) Find the standard deviation of the ages of these children.

2.52

(b) Find the median age.

13.1

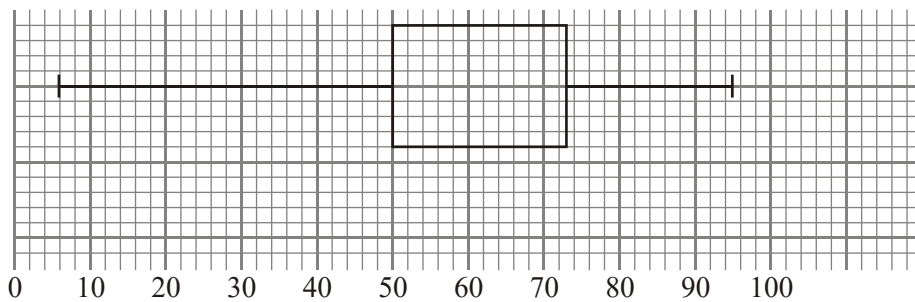
Working:

Answers:

- (a) (i)
(ii)
(b)

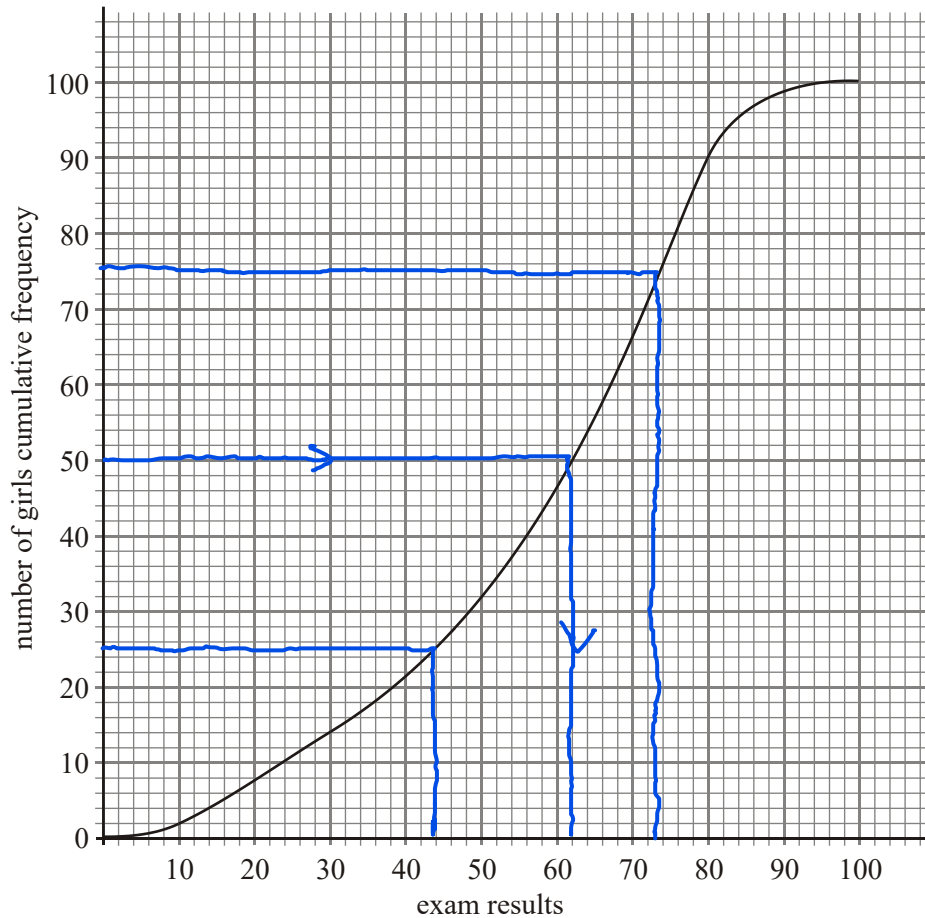
(Total 6 marks)

7. (a) The exam results for 100 boys are displayed in the following diagram:



- (i) Find the range of the results. $95 - 6 = 89$
(ii) Find the interquartile range. $73 - 50 = 23$
(iii) Write down the median. 60 (did not print!)

(b) The exam results for 100 girls are displayed in the diagram below:



(i) Write down the median. **62**

(ii) Find the inter quartile range. **$73 - 44 = 29$**

(c) Write down the set of results that are the most spread out and give a reason for your answer.

Girls → larger IQR

(Total 6 marks)

8. Peter has marked 80 exam scripts. He has calculated the mean for the scripts to be 62.1. Maria has marked 60 scripts with a mean of 56.8.

(a) Peter discovers an error in his marking. He gives two extra each to eleven of the scripts. Calculate the new value of the mean for Peter's scripts.

Peter:

$$\begin{aligned} \text{old total} & 80 \times 62.1 = 4968 \\ \text{extra marks} & 11 \times 2 = \frac{22}{4990} \\ \text{new total} & \\ \text{new mean} & = \frac{4990}{80} \end{aligned}$$

- (b) After the corrections have been made and the changed, Peter and Maria put all their scripts together. Calculate the value of the mean for all the scripts.

<i>Working:</i>	<i>Answers:</i>
	(a)
	(b)

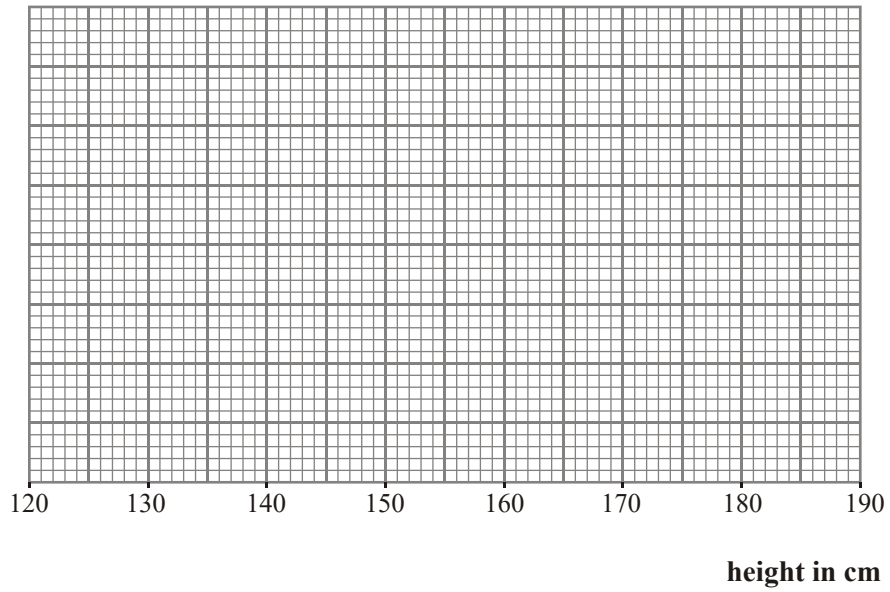
(Total 4 marks)

9. The following stem and leaf diagram gives the heights in cm of 39 schoolchildren.

Stem	Leaf	Key
13	2, 3, 3, 5, 8,	13 2 represents 132 cm.
14	1, 1, 1, 4, 5, 5, 9,	
15	3, 4, 4, 6, 6, 7, 7, 7, 8, 9, 9,	
16	1, 2, 2, 5, 6, 6, 7, 8, 8,	
17	4, 4, 4, 5, 6, 6,	
18	0,	

- (a) (i) State the lower quartile height,
(ii) State the median height
(iii) State the upper quartile height.

(b) Draw a box-and-whisker plot of the data using the axis below.



Working:

Answers:

(a) (i)

(ii)

(iii)

(Total 6 marks)