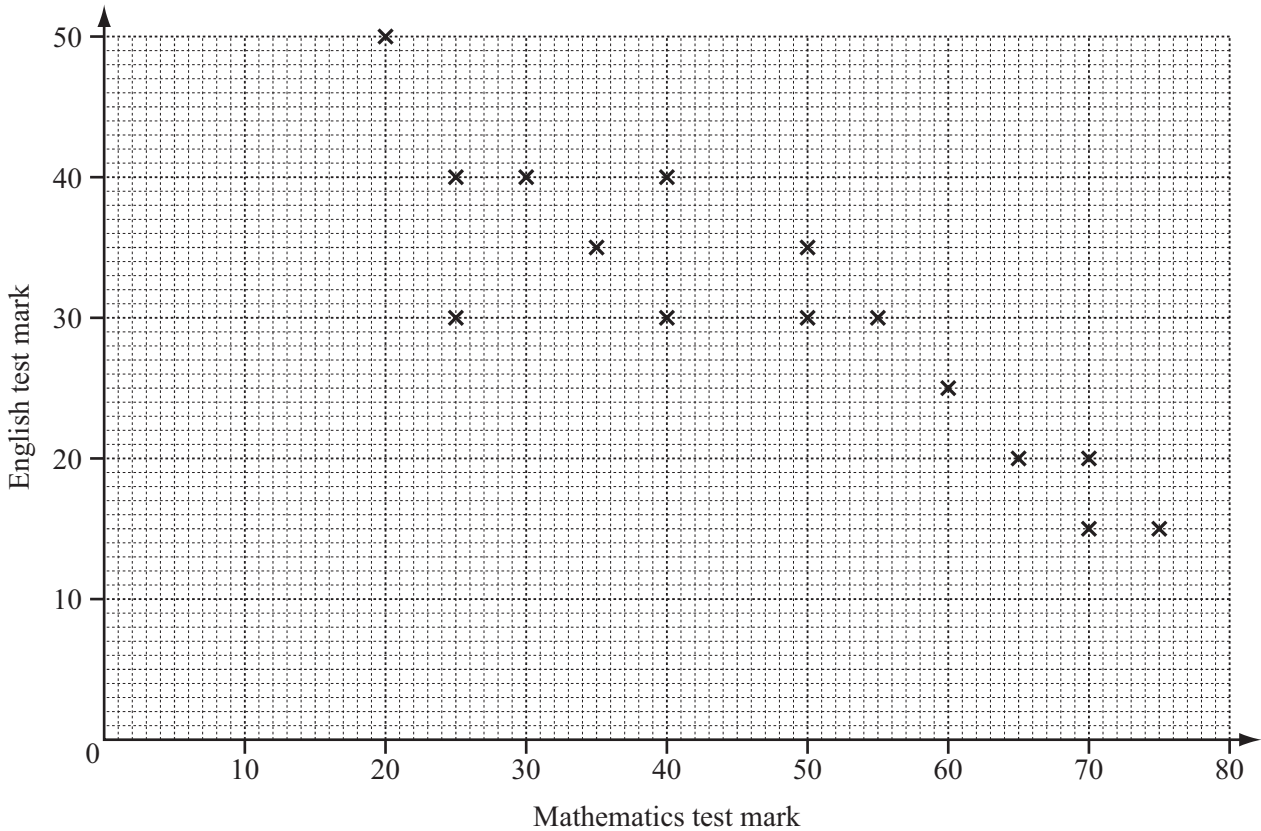


1



The scatter diagram shows the marks obtained in a Mathematics test and the marks obtained in an English test by 15 students.

(a) Describe the correlation.

Answer(a) ..... [1]

(b) The mean for the Mathematics test is 47.3 .  
The mean for the English test is 30.3 .

Plot the mean point (47.3, 30.3) on the scatter diagram above. [1]

(c) (i) Draw the line of best fit on the diagram above. [1]

(ii) One student missed the English test.  
She received 45 marks in the Mathematics test.

Use your line to estimate the mark she might have gained in the English test.

Answer(c)(ii) ..... [1]

2 In a survey of 60 cars, the type of fuel that they use is recorded in the table below.

Each car only uses one type of fuel.

Petrol	Diesel	Liquid Hydrogen	Electricity
40	12	2	6

(a) Write down the mode.

*Answer(a)* ..... [1]

(b) Olav drew a pie chart to illustrate these figures.

Calculate the angle of the sector for Diesel.

*Answer(b)* ..... [2]

(c) Calculate the probability that a car chosen at random uses Electricity.

Write your answer as a fraction in its simplest form.

*Answer(c)* ..... [2]

---

3 The table shows information about the heights of 120 girls in a swimming club.

Height ( $h$ metres)	Frequency
$1.3 < h \leq 1.4$	4
$1.4 < h \leq 1.5$	13
$1.5 < h \leq 1.6$	33
$1.6 < h \leq 1.7$	45
$1.7 < h \leq 1.8$	19
$1.8 < h \leq 1.9$	6

(a) (i) Write down the modal class.

*Answer(a)(i)* ..... m [1]

(ii) Calculate an estimate of the mean height. Show all of your working.

*Answer(a)(ii)* ..... m [4]

(b) Girls from this swimming club are chosen at random to swim in a race.  
Calculate the probability that

(i) the height of the first girl chosen is more than 1.8 metres,

*Answer(b)(i)* ..... [1]

(ii) the heights of **both** the first and second girl chosen are 1.8 metres or less.

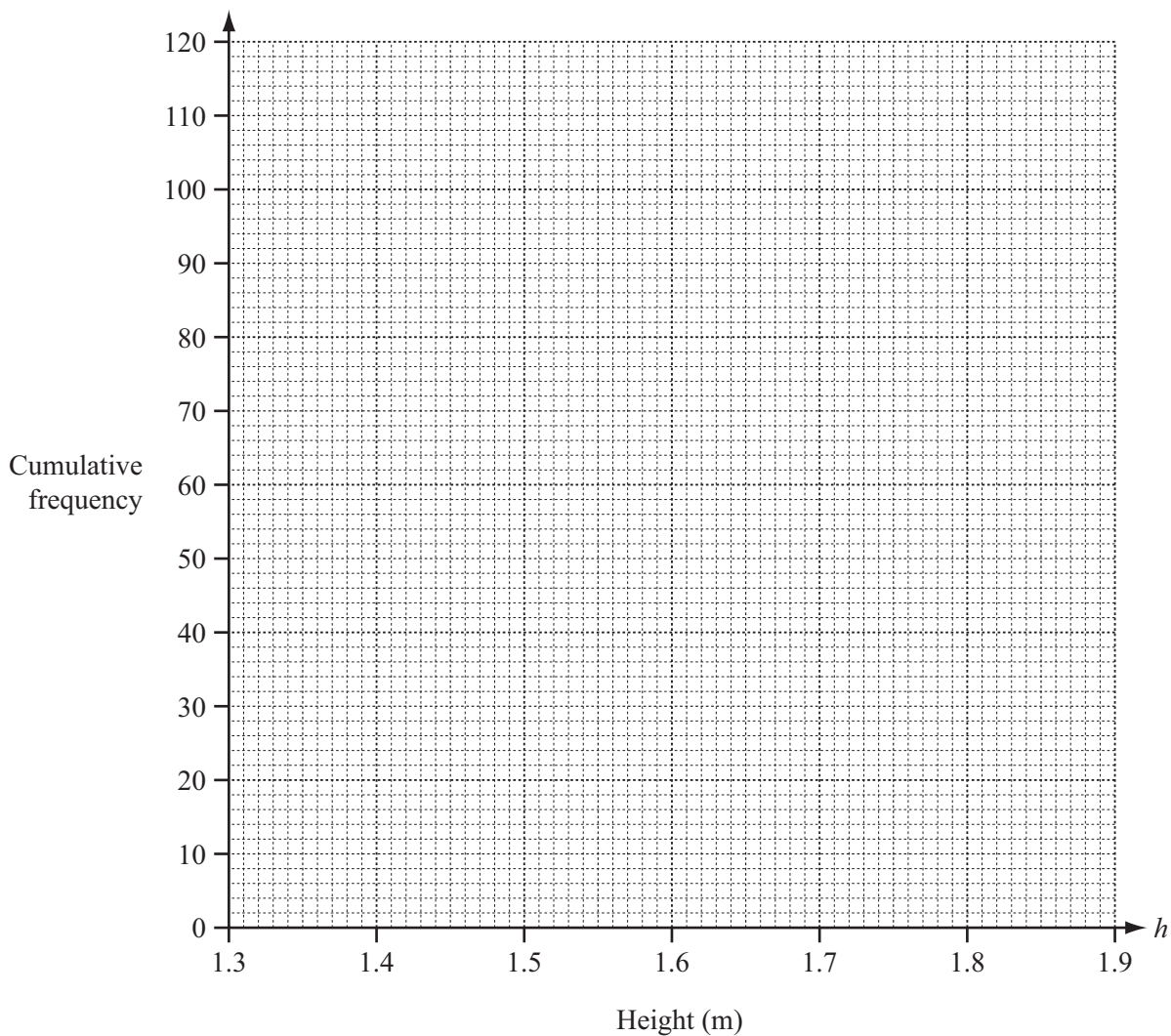
*Answer(b)(ii)* ..... [3]

(c) (i) Complete the cumulative frequency table for the heights.

Height ( $h$ metres)	Cumulative frequency
$h \leq 1.3$	0
$h \leq 1.4$	4
$h \leq 1.5$	17
$h \leq 1.6$	50
$h \leq 1.7$	
$h \leq 1.8$	114
$h \leq 1.9$	

[1]

(ii) Draw the cumulative frequency graph on the grid.



[3]

(d) Use your graph to find

(i) the median height,

Answer(d)(i) ..... m [1]

(ii) the 30th percentile.

Answer(d)(ii) ..... m [1]

4 (a) times,  $t$  seconds, for 200 people to solve a problem are shown in the table.

Time ( $t$ seconds)	Frequency
$0 < t \leq 20$	6
$20 < t \leq 40$	12
$40 < t \leq 50$	20
$50 < t \leq 60$	37
$60 < t \leq 70$	42
$70 < t \leq 80$	50
$80 < t \leq 90$	28
$90 < t \leq 100$	5

Calculate an estimate of the mean time.

*Answer(a)* ..... s [4]

(b) (i) Complete the cumulative frequency table for this data.

Time ( $t$ seconds)	$t \leq 20$	$t \leq 40$	$t \leq 50$	$t \leq 60$	$t \leq 70$	$t \leq 80$	$t \leq 90$	$t \leq 100$
Cumulative Frequency	6	18	38			167		

[2]

(ii) Draw the cumulative frequency graph on the grid opposite to show this data. [4]

(c) Use your cumulative frequency graph to find

(i) the median time,

*Answer(c)(i)* ..... s [1]

(ii) the lower quartile,

*Answer(c)(ii)* ..... s [1]

(iii) the inter-quartile range,

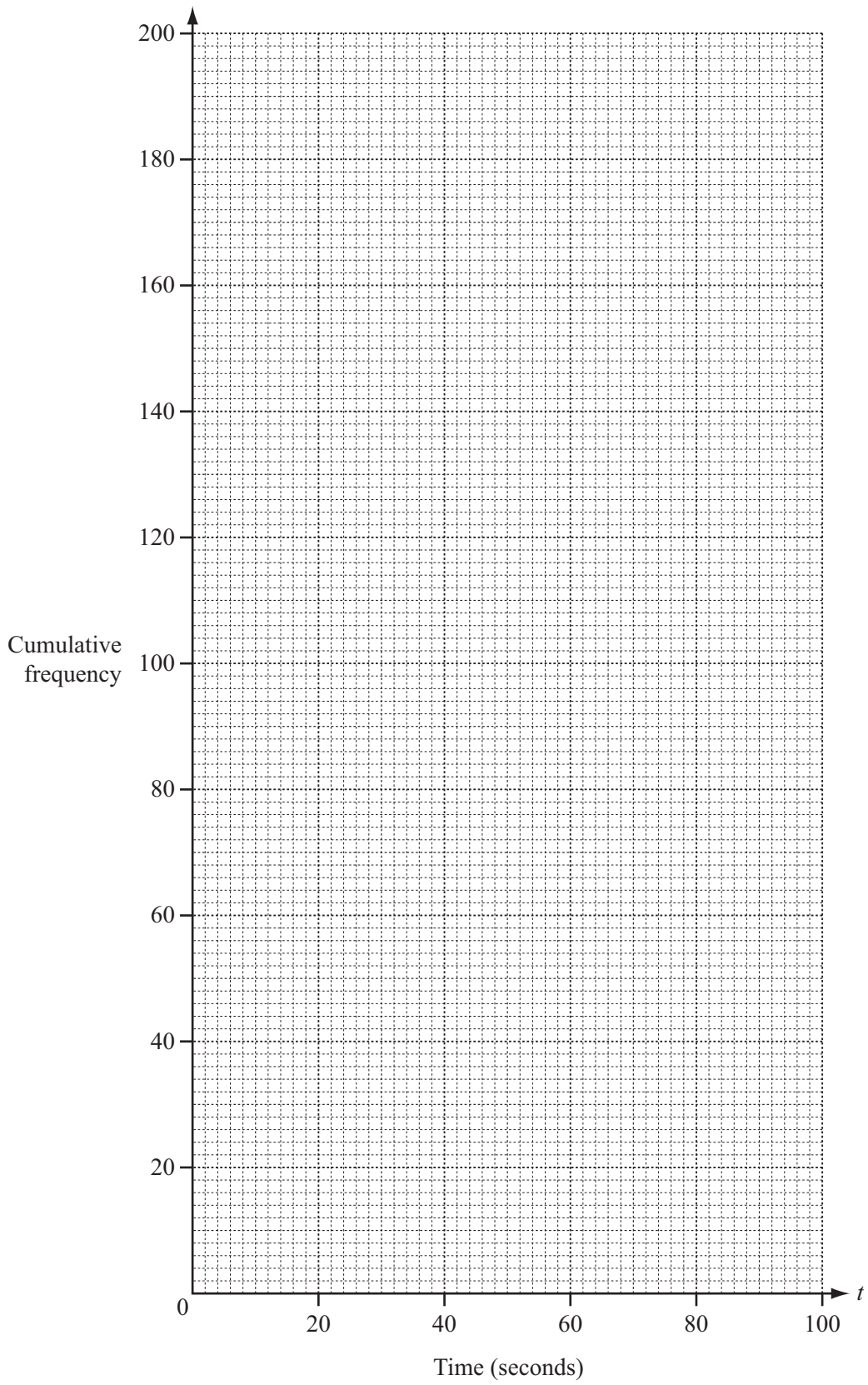
*Answer(c)(iii)* ..... s [1]

(iv) how many people took between 65 and 75 seconds to solve the problem,

*Answer(c)(iv)* ..... [1]

(v) how many people took longer than 45 seconds to solve the problem.

*Answer(c)(v)* ..... [2]



5 The times,  $t$  minutes, taken for 200 students to cycle one kilometre are shown in the table.

Time ( $t$ minutes)	$0 < t \leq 2$	$2 < t \leq 3$	$3 < t \leq 4$	$4 < t \leq 8$
Frequency	24	68	72	36

(a) Write down the class interval that contains the median.

*Answer(a)* ..... [1]

(b) Calculate an estimate of the mean.  
Show all your working.

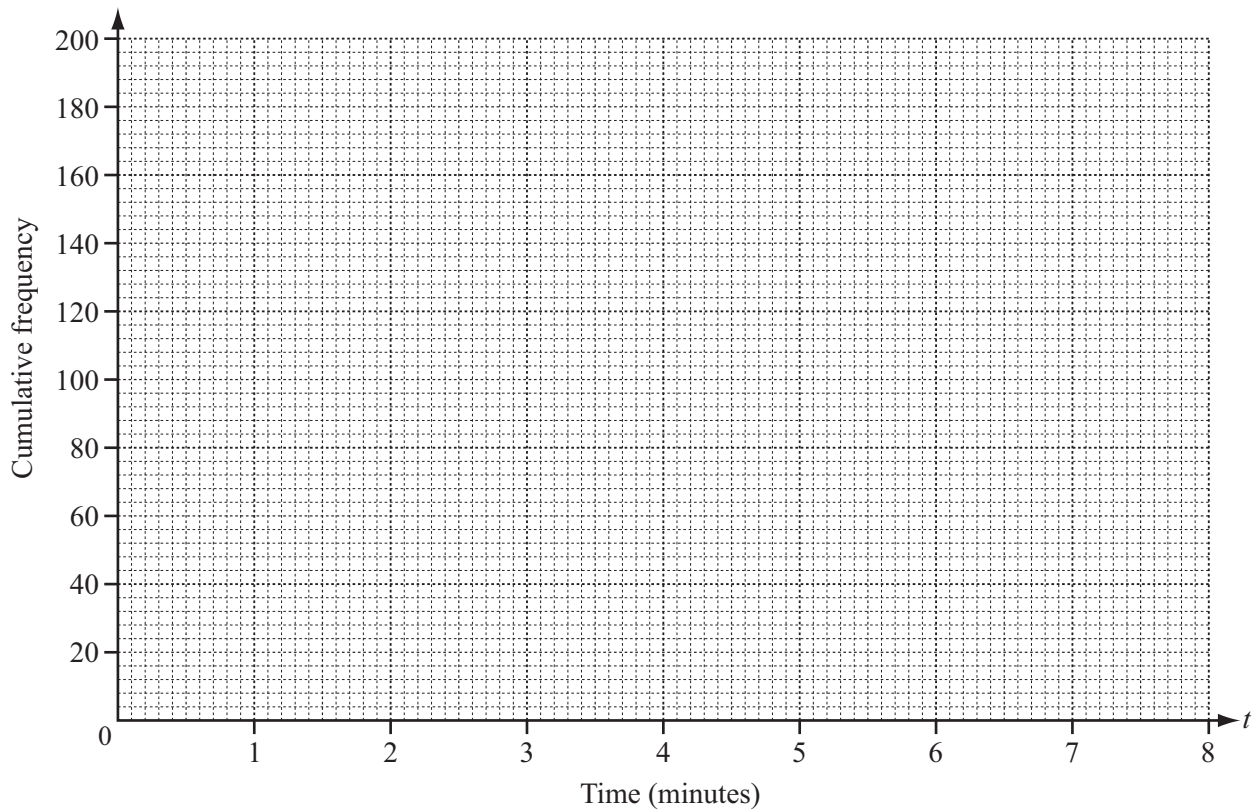
*Answer(b)* ..... min [4]

(c) (i) Use the information in the table opposite to complete the cumulative frequency table.

Time ( $t$ minutes)	$t \leq 2$	$t \leq 3$	$t \leq 4$	$t \leq 8$
Cumulative frequency	24			200

[1]

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



[3]

(iii) Use your diagram to find the median, the lower quartile and the inter-quartile range.

Answer(c)(iii) Median = ..... min

Lower quartile = ..... min

Inter-quartile range = ..... min [3]



- 6 (a) The number of people living in six houses is

3, 8, 4,  $x$ ,  $y$  and  $z$ .

The median is  $7\frac{1}{2}$ .

The mode is 8.

The mean is 7.

Find a value for each of  $x$ ,  $y$  and  $z$ .

[5]

- (b) The grouped frequency table below shows the amount (\$A) spent on travel by a number of students.

Cost of travel (\$A)	$0 < A \leq 10$	$10 < A \leq 20$	$20 < A \leq 40$
Frequency	15	$m$	$n$

- (i) Write down an estimate for the total amount in terms of  $m$  and  $n$ .

[2]

- (ii) The calculated estimate of the mean amount is \$13 exactly.

Write down an equation containing  $m$  and  $n$ .

Show that it simplifies to  $2m + 17n = 120$ .

[3]

- (iii) A student drew a histogram to represent this data.

The area of the rectangle representing the  $0 < A \leq 10$  group was equal to the sum of the areas of the other two rectangles.

Explain why  $m + n = 15$ .

[1]

- (iv) Find the values of  $m$  and  $n$  by solving the simultaneous equations

$$2m + 17n = 120,$$

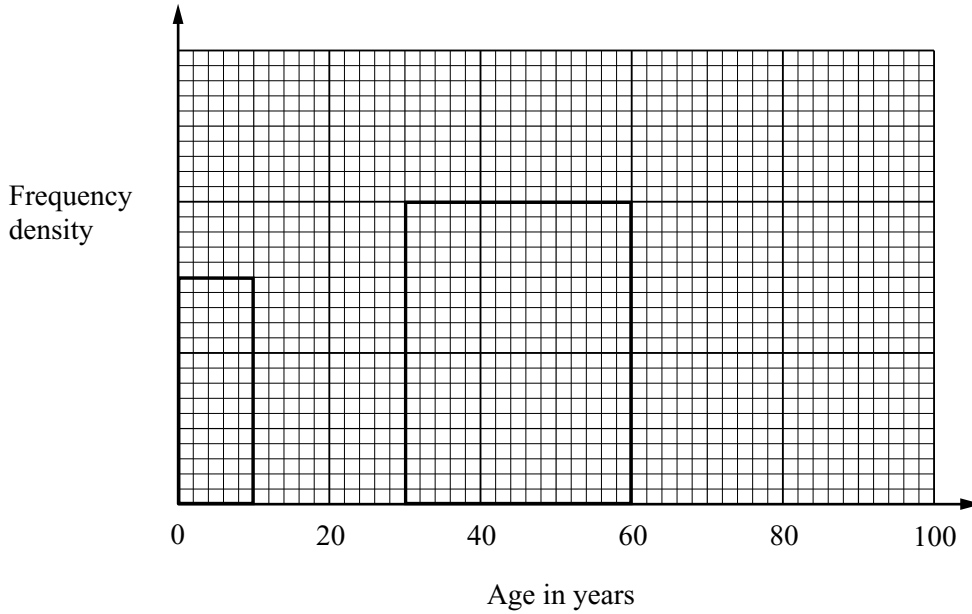
$$m + n = 15.$$

[3]

---

7 A doctor's patients are grouped by age, as shown in the table and the histogram below.

Age ( $x$ years)	$0 \leq x < 10$	$10 \leq x < 30$	$30 \leq x < 60$	$60 \leq x < 100$
Number of patients	300	600		880



- (a) Complete the following:  
 1 cm<sup>2</sup> represents ..... patients. [1]
- (b) Use the histogram to fill in the blank in the table. [1]
- (c) Draw the missing two rectangles to complete the histogram. [2]

8 (a) Multiply  $\begin{pmatrix} 5 & 4 \\ -3 & -2 \end{pmatrix} \begin{pmatrix} 2 & 1 & -4 \\ 0 & 3 & 6 \end{pmatrix}$ .

Answer (a)  $\begin{pmatrix} & & \\ & & \end{pmatrix}$  [2]

(b) Find the inverse of  $\begin{pmatrix} 5 & 4 \\ -3 & -2 \end{pmatrix}$ .

Answer (b)  $\begin{pmatrix} & \\ & \end{pmatrix}$  [2]

**9 Answer the whole of this question on a sheet of graph paper.**

In a survey, 200 shoppers were asked how much they had just spent in a supermarket. The results are shown in the table.

Amount(\$x)	$0 < x \leq 20$	$20 < x \leq 40$	$40 < x \leq 60$	$60 < x \leq 80$	$80 < x \leq 100$	$100 < x \leq 140$
Number of shoppers	10	32	48	54	36	20

- (a) (i) Write down the modal class. [1]  
(ii) Calculate an estimate of the mean amount, giving your answer correct to 2 decimal places. [4]
- (b) (i) Make a cumulative frequency table for these 200 shoppers. [2]  
(ii) Using a scale of 2 cm to represent \$20 on the horizontal axis and 2 cm to represent 20 shoppers on the vertical axis, draw a cumulative frequency diagram for this data. [4]
- (c) Use your cumulative frequency diagram to find  
(i) the median amount, [1]  
(ii) the upper quartile, [1]  
(iii) the interquartile range, [1]  
(iv) how many shoppers spent at least \$75. [2]
-