



DATE 10.10.19.

IG - Maths

0580

Statistics

Exercise: Paper-4

SP-20; M-19; M-18;

S-19; S-18,

W-18

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(Director)

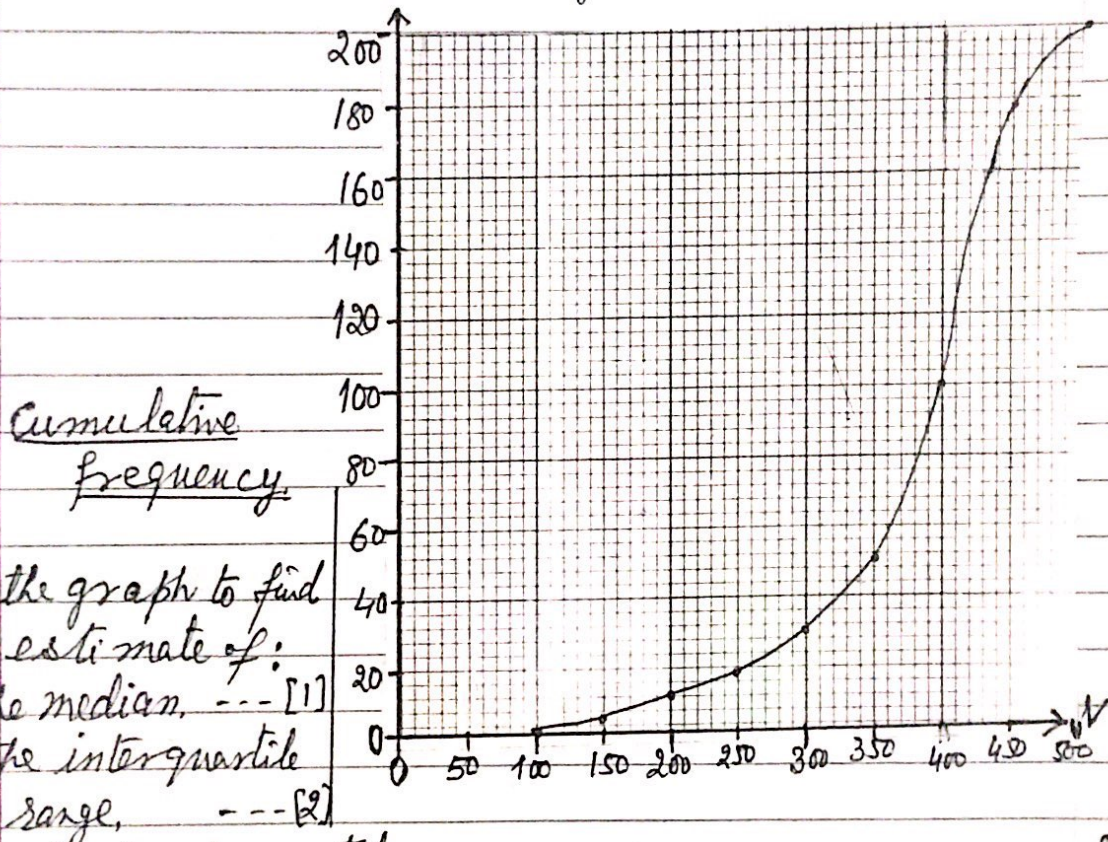
Alliance World School

Noida, Delhi - NCR.

INDIA.



1. (a) 200 students estimate the volume, $V \text{ m}^3$, of a classroom. The cumulative frequency diagram shows their results.



Use the graph to find an estimate of:

(i) the median, --- [1]

(ii) the interquartile range, --- [2]

(iii) the 60% percentile, --- [1]

(iv) the number of students who estimate that the volume is greater than 300 m^3 , --- [2]

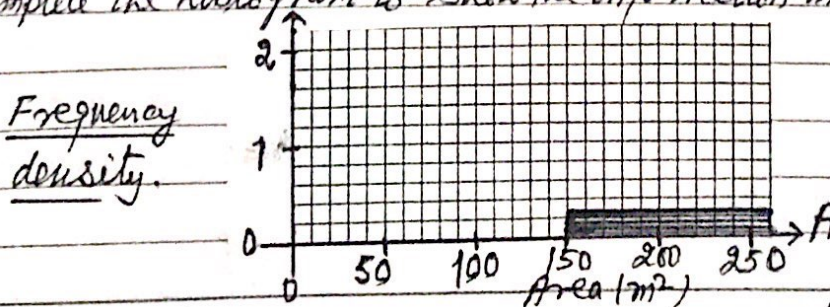
(b) The 200 students also estimate the total area, $A \text{ m}^2$, of the windows in the classroom.

The table shows their results:

Area $A (\text{m}^2)$	$20 < A \leq 60$	$60 < A \leq 100$	$100 < A \leq 150$	$150 < A \leq 250$
Frequency	32	64	80	24

(i) Calculate an estimate of mean. You must show all your working. --- [4]

(ii) Complete the histogram to show the information in the table.



(continued →)



(continued →)

1(b)(iii) Two students are chosen at random from those students that estimated the area of the windows to be more than 100m^2 . Find the probability that one of the two students estimates the area to be greater than 150m^2 and the other student estimates the area to be 150m^2 or less. [SP-20/04/Q2] --- [3]

2. (a) 20 students each record the mass, p grams, of their pencil case. The table below shows the results.

Mass (p grams)	$0 < p \leq 50$	$50 < p \leq 100$	$100 < p \leq 125$	$125 < p \leq 150$	$150 < p \leq 200$
Frequency	2	5	4	6	3

(i) Calculate an estimate of mean mass. --- [4]

(ii) Use the frequency table above to complete the cumulative frequency table.

Mass (p grams)	$p \leq 50$	$p \leq 100$	$p \leq 125$	$p \leq 150$	$p \leq 200$
Cumulative frequency					

--- [2]

(iii) A student is chosen at random. Find the prob, that this student has a pencil case with a mass greater than 150g . --- [1]

(b) Some students each record the mass, m kg, of their school bag. Adil wants to draw a histogram to show this information. Complete the table below:

Mass (m kg)	$0 < m \leq 4$	$4 < m \leq 6$	$6 < m \leq 7$	$7 < m \leq 10$
Frequency	32			42
Height of bar on histogram (cm)	1.6	2	1.2	2.8

... [3]

(c) The frequency table below shows information about the number of books read by some students in a reading marathon.

Number of books read	1	2	3	4	5	6	7	8
Frequency	2	2	16	10	9	4	x	2

(i) The mean number of books read is 4.28 . Find the value of x . --- [3]

(ii) Write down the mode --- [1]

(iii) Write down the median. --- [1]

[M-19/42/Q7]



3. The frequency table shows information about the time, m minutes, that each of 160 people spend in a library.

Time (m minutes)	$0 < m \leq 10$	$10 < m \leq 40$	$40 < m \leq 60$	$60 < m \leq 90$	$90 < m \leq 100$	$100 < m \leq 120$
Frequency	3	39	43	55	11	9

(a) (i) Find the prob that one of these people, chosen at random, spends more than 100 minutes in the library. -- [1]

(ii) Calculate an estimate of the mean time spent in the library. -- [4]

(b) complete the cumulative frequency table below. -- [2]

Time (m minutes)	$m \leq 10$	$m \leq 40$	$m \leq 60$	$m \leq 90$	$m \leq 100$	$m \leq 120$
Cumulative frequency	3	42				

(c) on the grid opposite, draw the cumulative frequency diagram. -- [3]

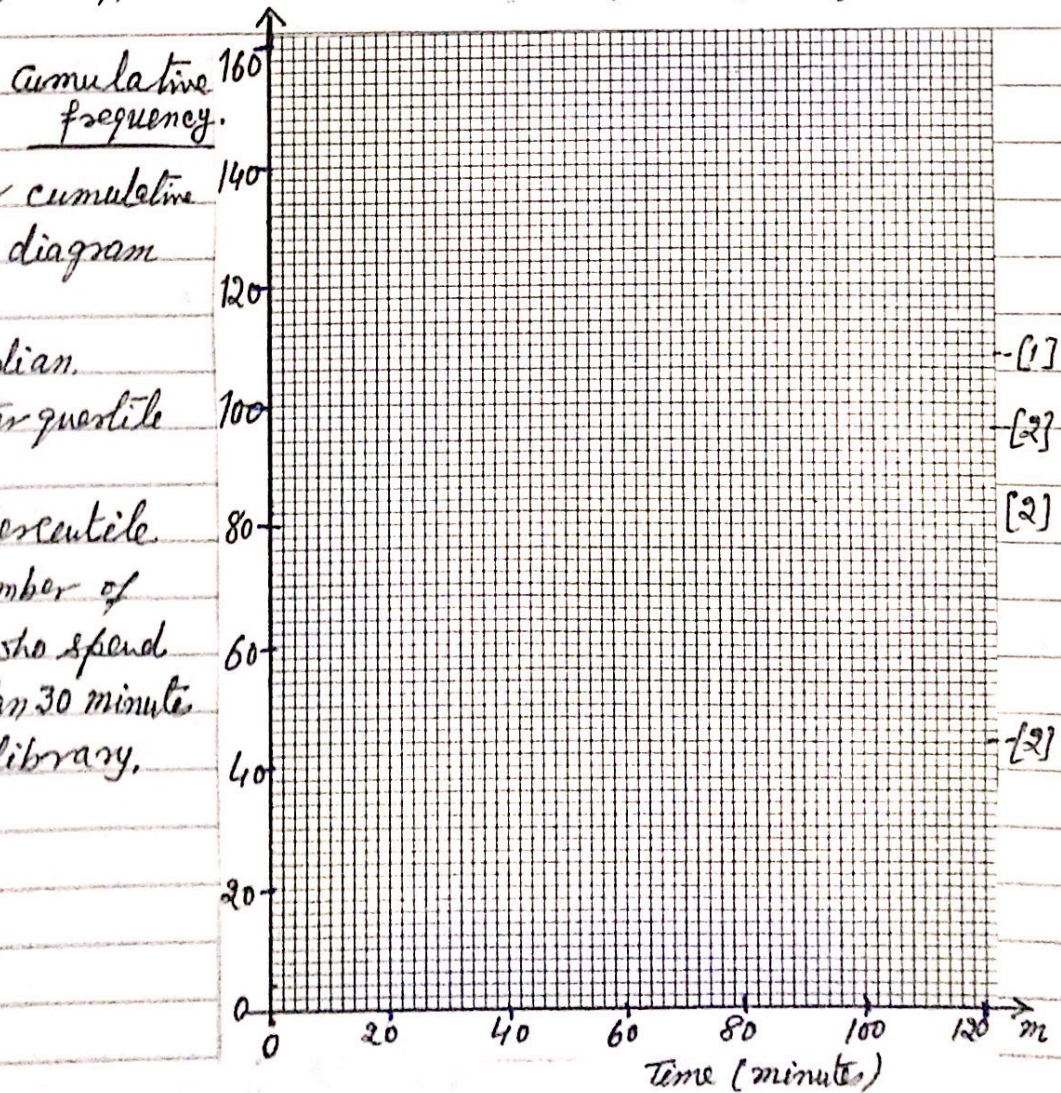
(d) Use your cumulative frequency diagram to find.

(i) the median. -- [1]

(ii) the inter quartile range. -- [2]

(iii) the 90% percentile. [2]

(iv) the number of people who spend more than 30 minutes in the library. -- [2]



[M-18 / 42] Q 7



4(a) The test scores of 14 students are shown below.

21 21 23 26 25 21 22 20 21 23 23 27 24 21

(i) Find the range, mode, median and mean of the test scores. -- [6]

(ii) A student is chosen at random.

Find the prob. that this student has a test score of more than 24. -- [1]

(b) Petra records the score in each test she takes.

The mean of the first n scores is x . [5-19/4/24]

The mean of the first $(n-1)$ scores is $(x+1)$

Find the n th score in terms of n and x .

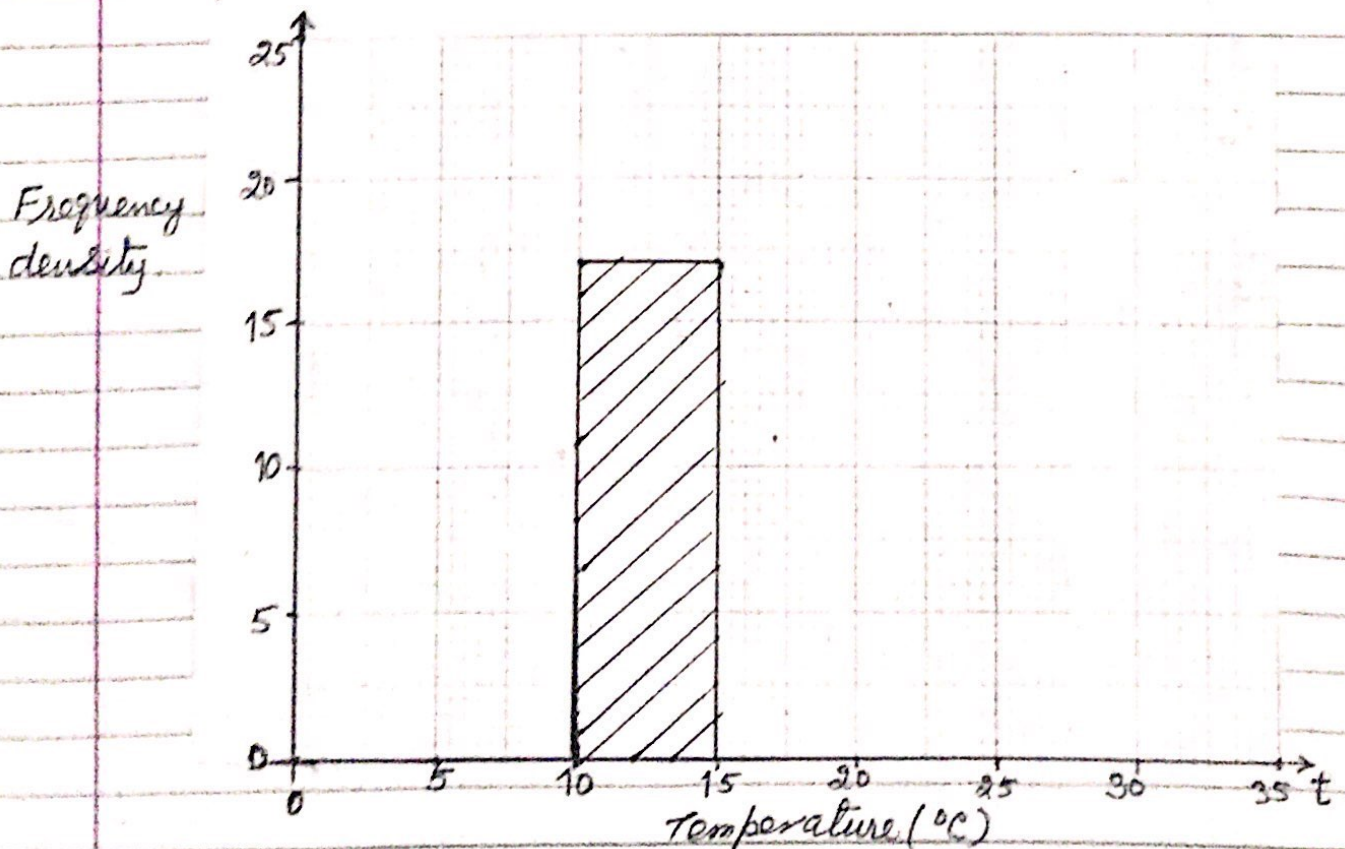
Give your answer in its simplest form. --- [3]

(c) During one year the midday temperatures, $t^{\circ}\text{C}$, in Redford were recorded. The table shows the results.

Temperature ($t^{\circ}\text{C}$)	$0 < t \leq 10$	$10 < t \leq 15$	$15 < t \leq 20$	$20 < t \leq 25$	$25 < t \leq 35$
Number of days	50	85	100	120	70

(i) Calculate the estimate of the mean. --- [4]

(ii) Complete the histogram to show the information in the table. -- [4]





5. 100 students were each asked how much money, \$ m , they spent in one week.

The frequency table shows the results.

Amount (\$ m)	$0 < m \leq 5$	$5 < m \leq 10$	$10 < m \leq 20$	$20 < m \leq 30$	$30 < m \leq 50$
Frequency	16	38	30	9	7

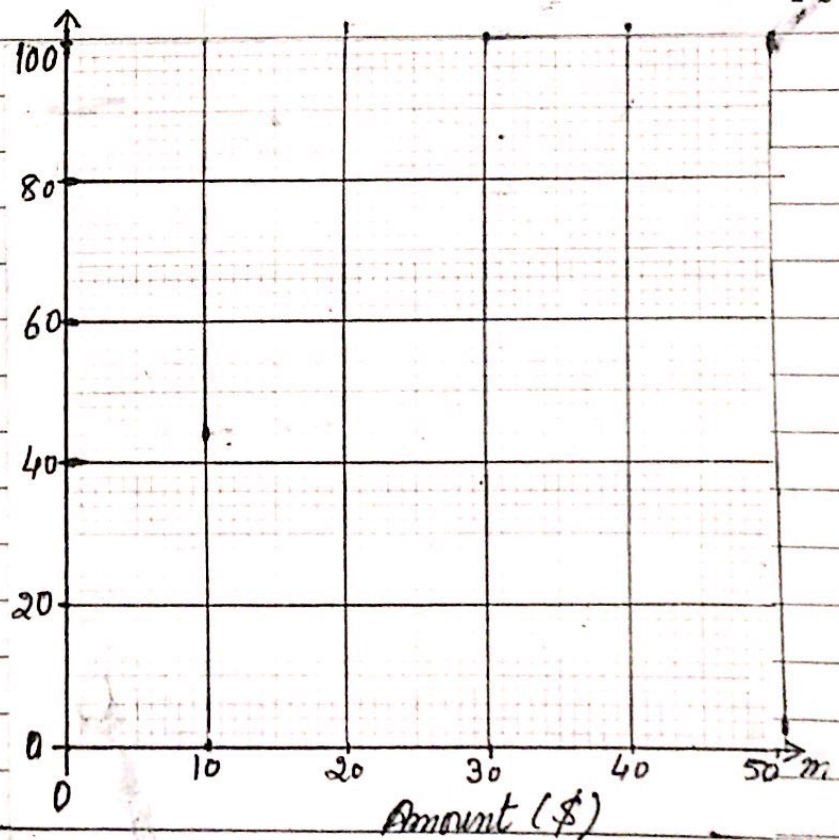
(a) Calculate an estimate of mean. --- [4]

(b) Complete the cumulative frequency table below.

Amount (\$ m)	$m \leq 5$	$m \leq 10$	$m \leq 20$	$m \leq 30$	$m \leq 50$
Cumulative frequency	16				100

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

Cumulative frequency



(d) Use your cumulative frequency diagram to find an estimate for,

- (i) the median --- [1]
- (ii) the interquartile range. --- [2]
- (iii) the number of students who spent more than \$25. --- [2]

5-19 | 42 | 29

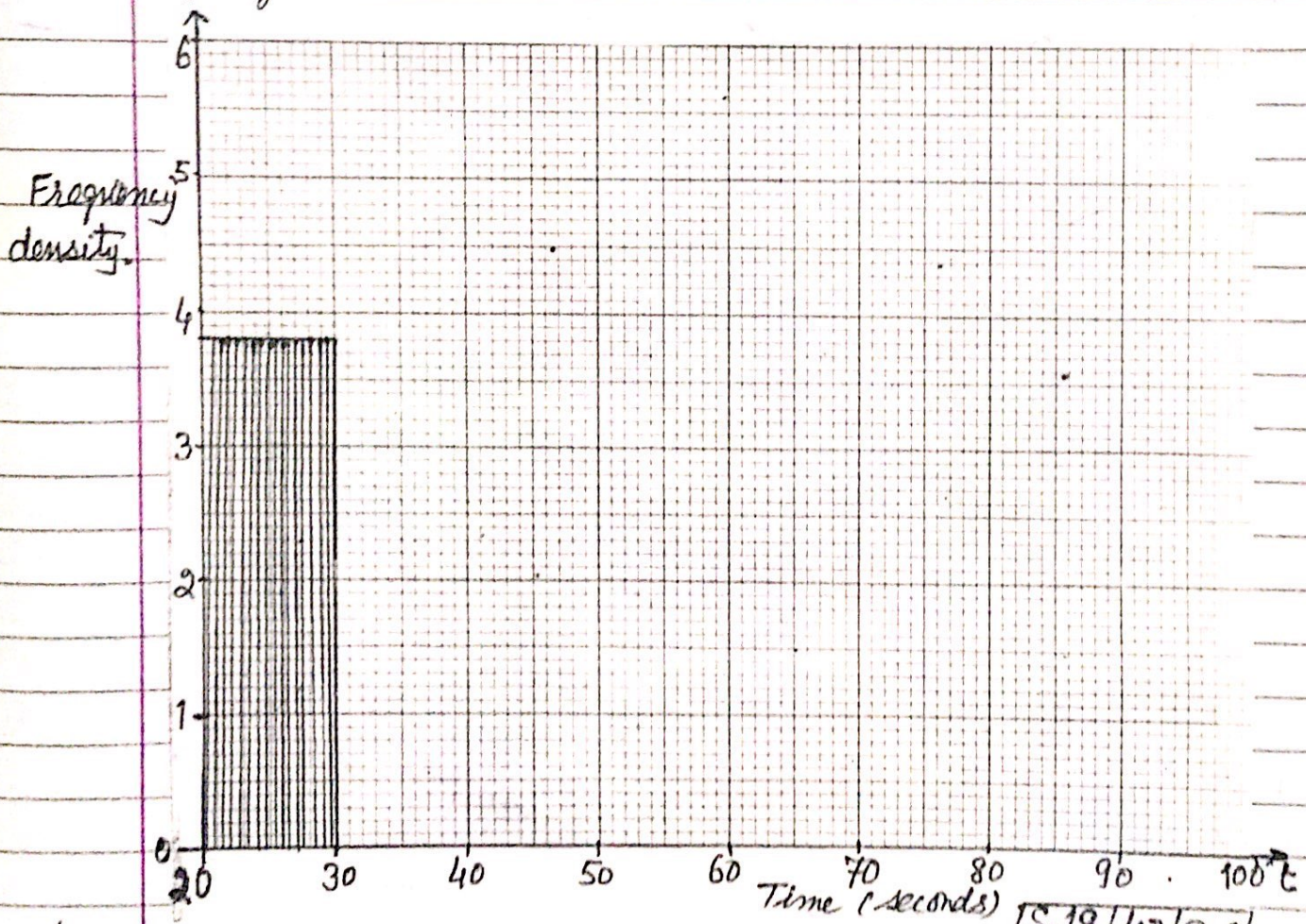


6. The table shows the time, t seconds, taken by each of 120 boys to solve a puzzle.

Time (t seconds)	$20 < t \leq 30$	$30 < t \leq 35$	$35 < t \leq 40$	$40 < t \leq 60$	$60 < t \leq 100$
Frequency	38	27	21	16	18

(a) Calculate an estimate of the mean time. -- [4]

(b) On the grid, complete the histogram to show the information in the frequency table.



Q7. The time taken for each of 120 students to complete a cooking challenge is shown in the table.

Time (t minutes)	$20 < t \leq 25$	$25 < t \leq 30$	$30 < t \leq 35$	$35 < t \leq 40$	$40 < t \leq 45$
Frequency	44	32	28	12	4

(a) (i) Write down the modal time interval. -- [1]

(Continued →)



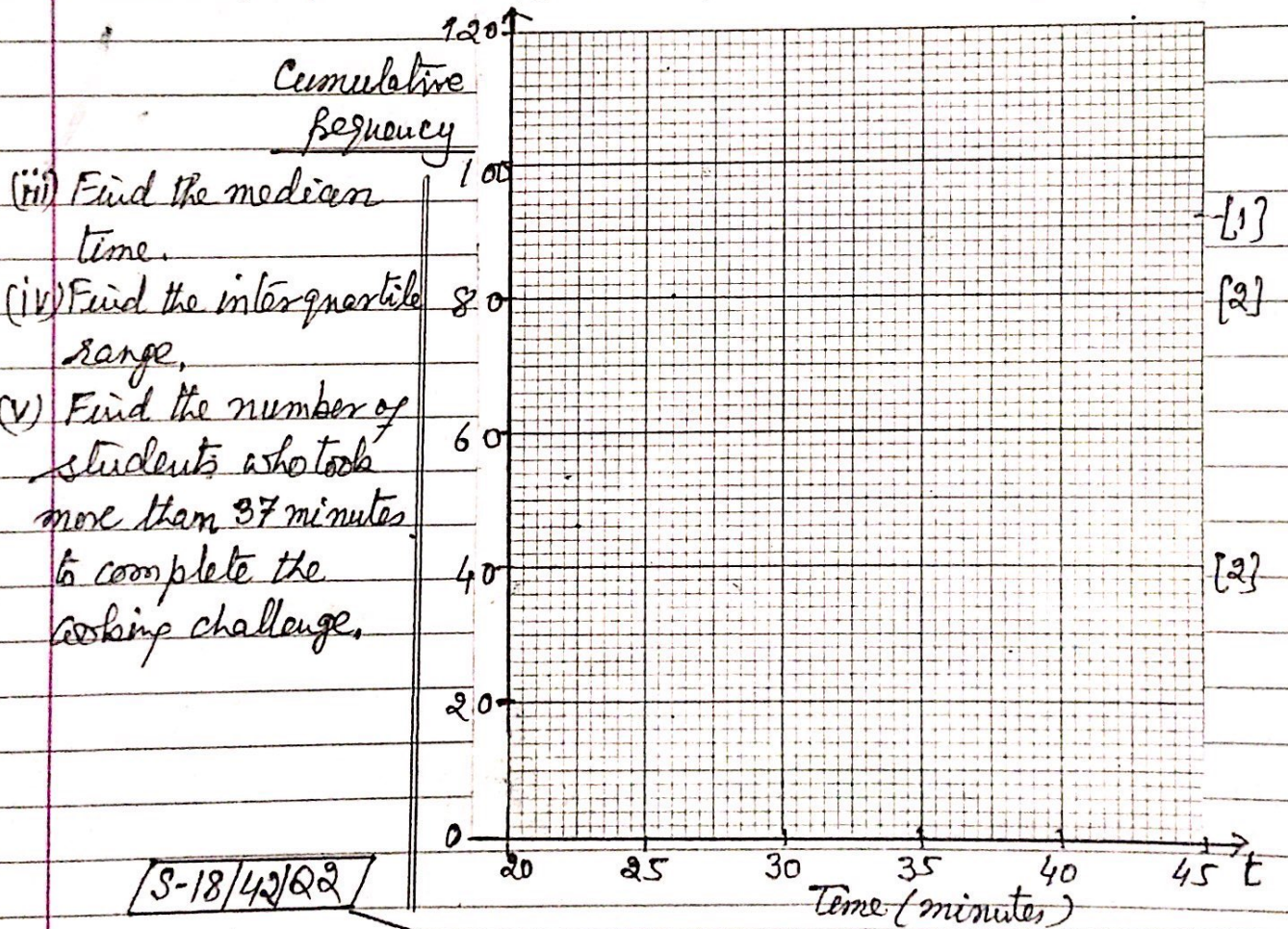
(continued →)

- 7 (a) (i) Write down the interval containing the median time. --- [1]
 (iii) Calculate an estimate of mean time. --- [4]
 (iv) A student is chosen at random.
 Find the prob. that this student takes more than 40 minutes. --- [1]

(b) (i) Complete the cumulative frequency table.

Time (t minutes)	$t \leq 20$	$t \leq 25$	$t \leq 30$	$t \leq 35$	$t \leq 40$	$t \leq 45$
Cumulative frequency	0	44				

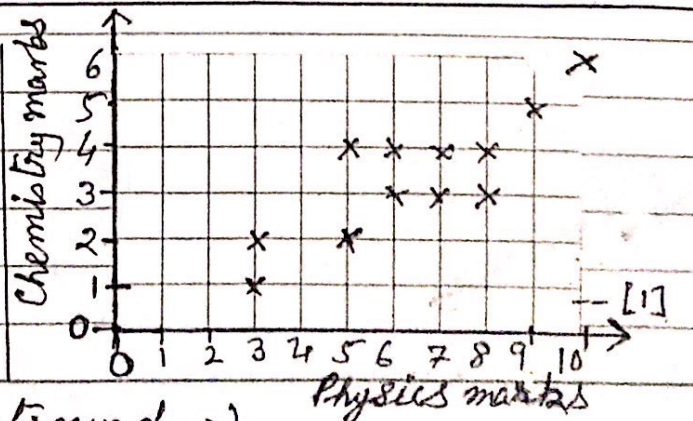
(ii) on the grid, draw a c.f. diagram to show this information. [3]



- (iii) Find the median time. [1]
 (iv) Find the interquartile range. [2]
 (v) Find the number of students who took more than 37 minutes to complete the cooking challenge. [2]

[S-18/42/Q2]

8(a) The scatter diagram shows the physics marks and the Chemistry marks for each of 12 students.



(i) What type of correlation is shown in the scatter diagram? [1]

(continued →)



8(a) (ii) On the scatter diagram, draw a line of best fit. ---[1]

(iii) Find an estimate of the chemistry marks for another student who has a physics mark of 4, ---[1]

(b) A teacher records the number of days each of the 24 students in her class are absent. The frequency table shows the results.

Number of days	0	1	2	3	4	5
Frequency	10	8	3	2	0	1

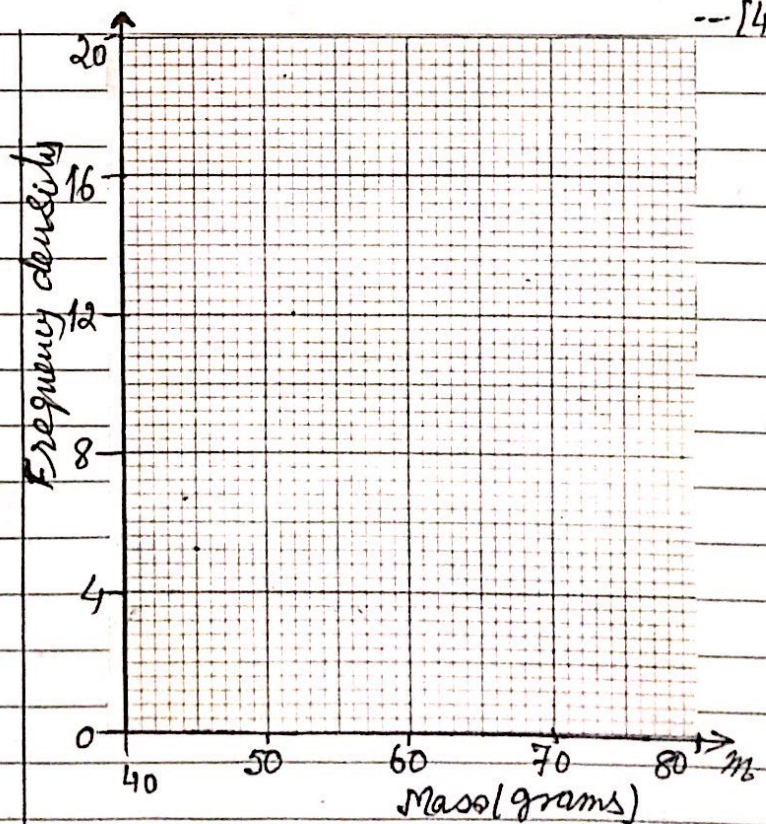
Find the mode, the median and the mean. ---[5]

(c) Three sizes of eggs are sold in a shop. The table shows the number of eggs of each size sold in one day.

Size	Small	Medium	Large
Mass (m gram)	$46 < m \leq 52$	$52 < m \leq 62$	$62 < m \leq 80$
Number of eggs sold	78	180	162

(i) Calculate an estimate of mean mass, ---[4]

(ii) On the grid, draw a histogram to show the information in the table. ---[4]



S-18 | 43 | Q3



9. A school nurse records the height, h , cm, of each of 180 children. The table shows the information

Height (h cm)	$60 < h \leq 70$	$70 < h \leq 90$	$90 < h \leq 100$	$100 < h \leq 110$	$110 < h \leq 115$	$115 < h \leq 125$
Frequency	8	26	35	67	28	16

(a) Calculate an estimate of mean. ---(4)

Give your answer correct to 1 decimal place.

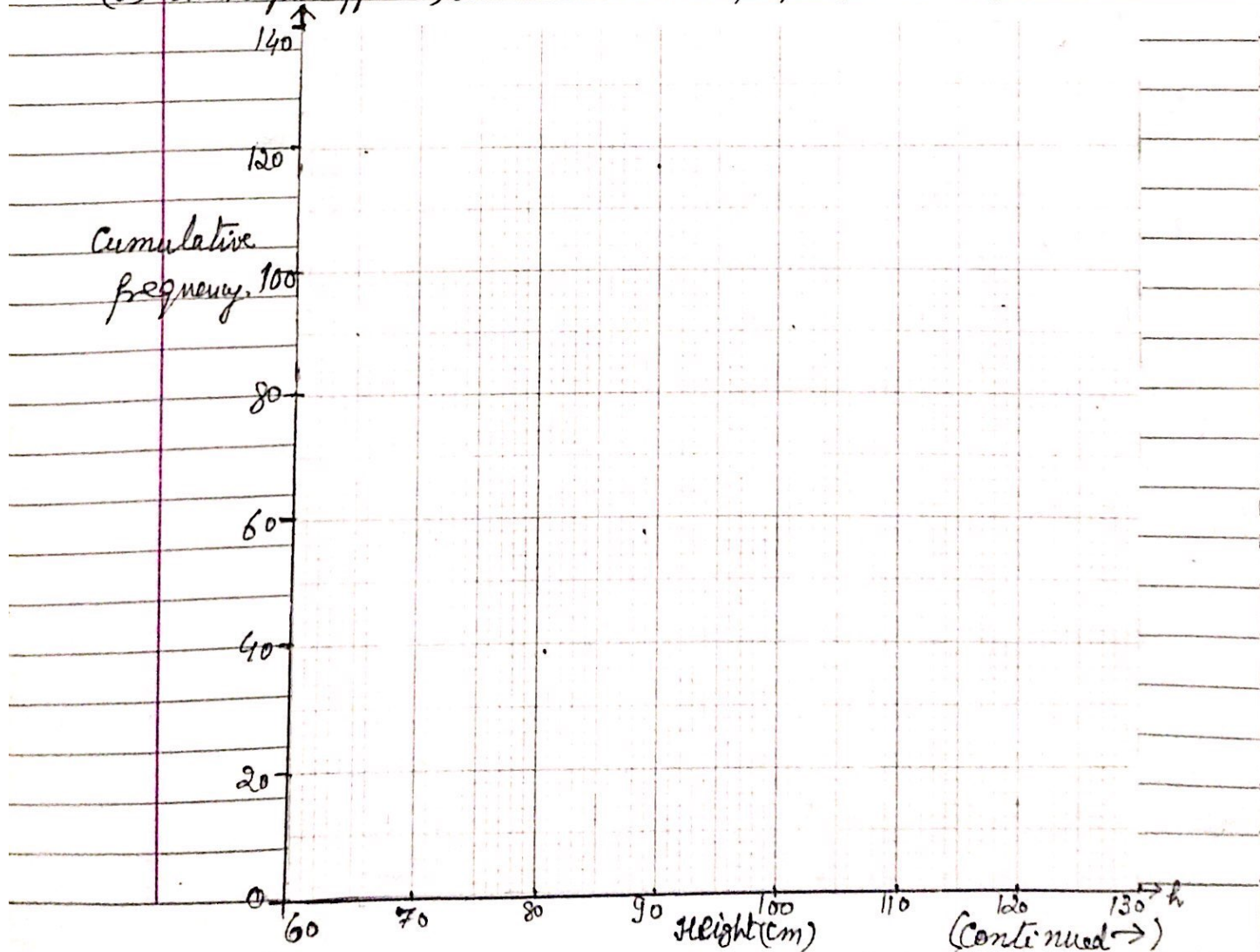
(b) In a histogram showing the information, the height of the bar for the interval $60 < h \leq 70$ is 0.4 cm.

Calculate the height of the bar for each of the following intervals.
 $115 < h \leq 125$; $110 < h \leq 115$; $70 < h \leq 90$. ---(3)

(c) Complete the cumulative frequency table below.

Height (h cm)	$h \leq 70$	$h \leq 90$	$h \leq 100$	$h \leq 110$	$h \leq 115$	$h \leq 125$
Cumulative frequency						

(d) On the grid opposite, draw a cumulative frequency diagram. ---(2)





(continued →)

9(e) Use your cumulative frequency diagram to find an estimate of:

(i) the interquartile range, --[2]

(ii) the 70% percentile --[2]

(iii) the number of children with height greater than 106cm, --[2]

[W-18 | 41 | Q 4]

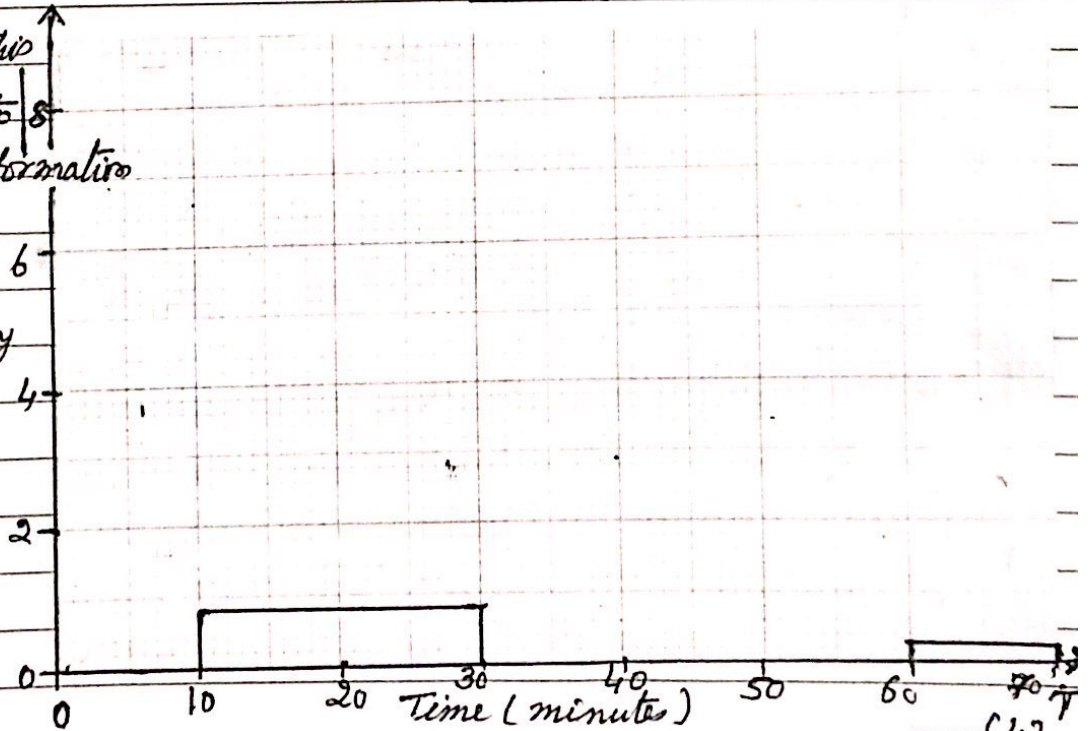
10(a) The table shows the amount of time, T minutes, 120 people each spend in a supermarket one Saturday.

Time (T min.)	Number of people
$10 < T \leq 30$	16
$30 < T \leq 40$	18
$40 < T \leq 45$	22
$45 < T \leq 50$	40
$50 < T \leq 60$	21
$60 < T \leq 70$	3

i) Use the mid-point of the intervals to calculate an estimate of the mean, --[4]

(ii) Complete this histogram to show the information in the table.

Frequency density

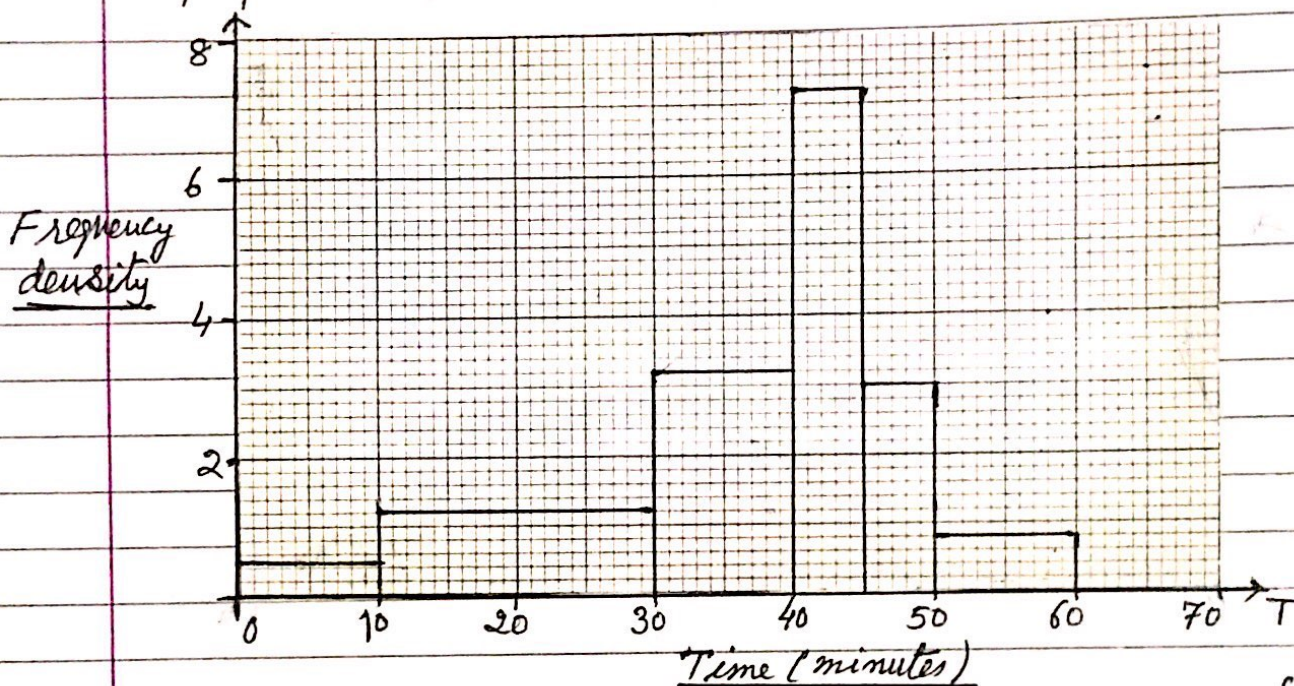


(continued →)



(continued →)

10(b) This histogram shows the amount of time, T minutes, 120 people each spend in the supermarket one Wednesday.



--- [1]

Make a comment comparing the distribution of the times for the two days.

[W-18/42/99]

11(a) A factory recycles metal.

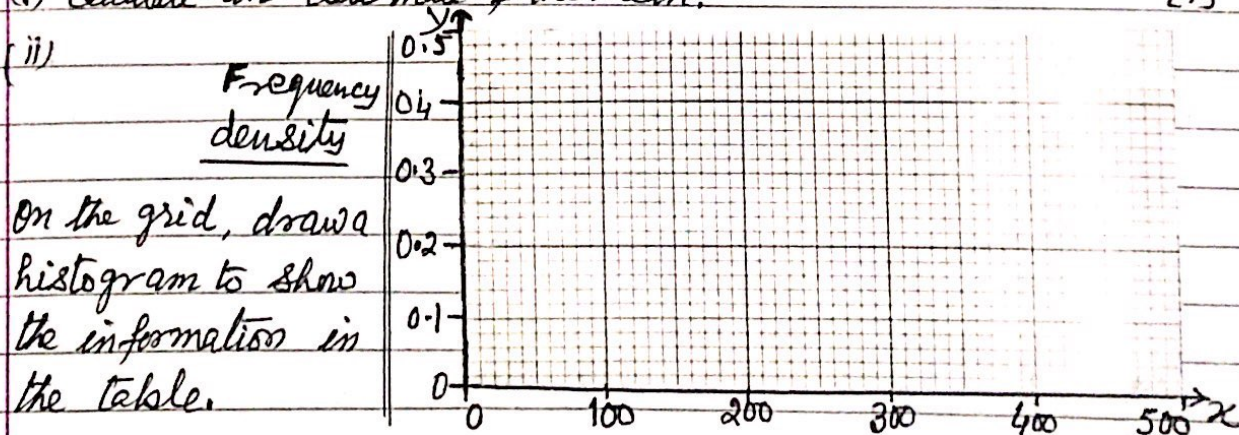
The mass, x tonnes, of metal is measured each week. The table shows the results for 52 weeks.

Mass (x tonnes)	$100 < x \leq 200$	$200 < x \leq 250$	$250 < x \leq 300$	$300 < x \leq 350$
Frequency	8	28	12	12

(i) Calculate an estimate of the mean.

--- [4]

(ii)

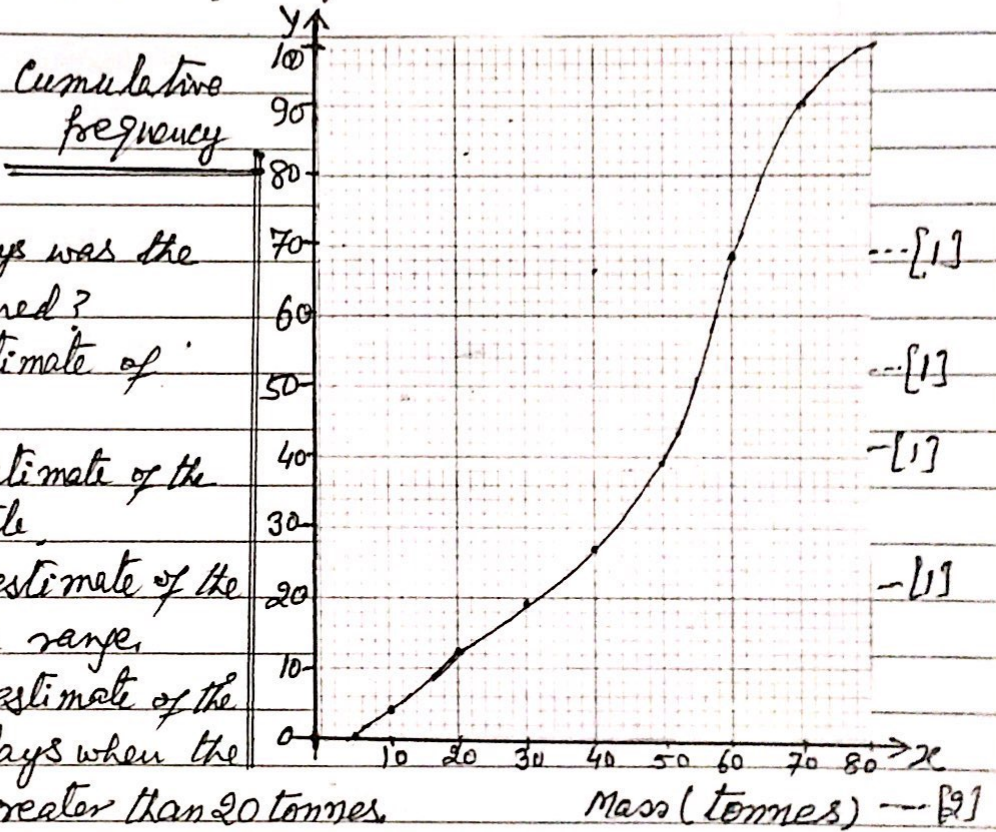


(continued →)



(Continued →)

*1(b) Another factory also recycles metal.
The mass, x tonnes, of metal is measured each day for a number of days.
The cumulative frequency diagram shows the results.



(i) For many days was the mass measured? --- [1]

(ii) Find an estimate of the median. --- [1]

(iii) Find an estimate of the upper quartile. --- [1]

(iv) Find an estimate of the interquartile range. --- [1]

(v) Find an estimate of the number of days when the mass was greater than 20 tonnes. --- [2]

W-18/43/25



Answers

1(a) (i) 400 (ii) 70
(iii) 405 to 410 (iv) 170
(b) (i) 106 (ii) correct histogram
(iii) $\frac{480}{7339}$

2(a) (i) 111.25 (ii)
(ii) 2, 7, 11, 17, 20
(iii) $\frac{3}{20}$
(b) 20, 6
(c) (i) 5 (ii) 3 (iii) 4

3 (a) (i) $\frac{9}{160}$ (ii) 58.125
(b) 85, 140, 151, 160
(c) correct curve
(d) (i) 57 to 59 (ii) 36 to 42
(iii) 92 to 94 (iv) 130 to 137.

4 (a) range = 7; mode = 21
Median = 22.5; Mean = 22.7
(b) $x - n + 1$
(c) (i) 16.6 (ii) correct histogram

5 (a) 12.8 (b) 54, 84, 93.
(c) correct diagram,
(d) (i) 9 to 9.8 (ii) 8.5 to 11.5
(iii) 10, 11 or 12

6 (a) 40.5 (b) correct histogram

7 (a) (i) $20 < t \leq 25$
(ii) $25 < t \leq 30$ (iii) 28.3
(iv) $\frac{4}{120}$
(b) (i) 76, 104, 116, 120
(ii) correct curve
(iii) 27 to 27.5 (iv) 8.5 to 9.5
(v) 8, 9, 10, 11 or 12

8 (a) (i) Positive (ii) correct ruled line
(iii) 2

(b) Mode = 0, Median = 1, Mean = 1.04
(c) (i) 60.9 (ii) correct histogram.

9 (a) 100.2
(b) 0.8; 2.8; 0.65
(c) 8, 34, 69, 136, 164
(d) correct diagram.

(e) (i) 15 to 17 (ii) 107 to 109
(iii) 66 to 72.

10 (a) (i) 42.8
(ii) Blocks of height 1.8, 4.4, 8, and 2.1

(b) Valid general comment about distribution \rightarrow on the average shoppers spend less time shopping on Wednesday.

11 (a) (i) 265
(ii) correct histogram
(b) (i) 100 (ii) 56 (iii) 62
(iv) 24 (v) 88.

