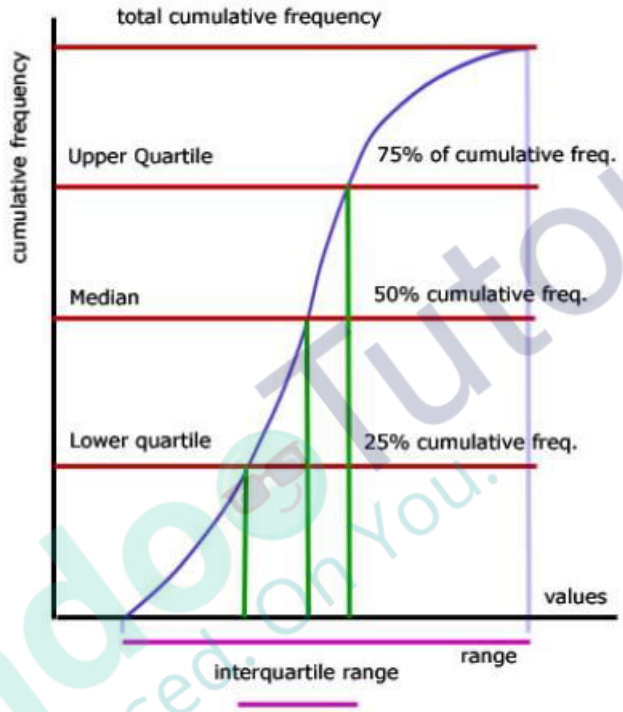


Inter Quartile Range = Upper Quartile – Lower Quartile

Comparison of distribution

Median :- Measure of central tendency (Performance)

IQR : - Measure of variability (consistency)

Bigger IQR = More spread/variation in data = less consistent is the data

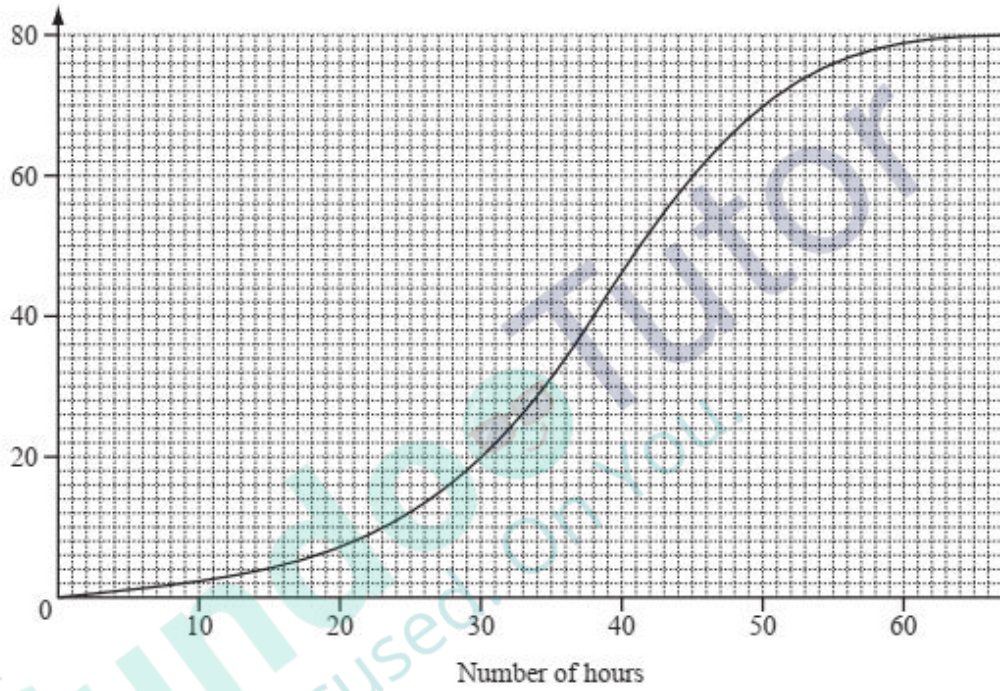
Smaller IQR = Less spread/variation in data = more consistent is the data

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[Q1 to Q18]

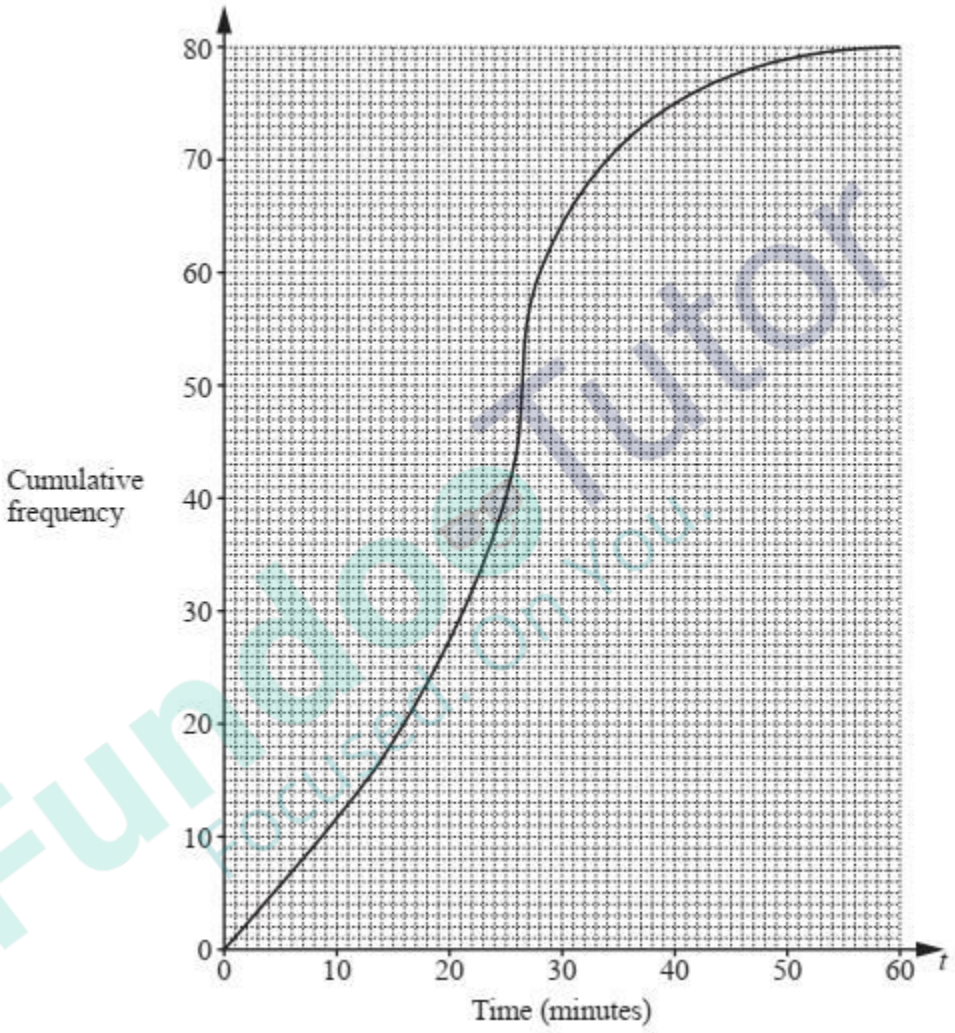
1. The number of hours that a group of 80 students spent using a computer in a week was recorded. The results are shown by the cumulative frequency curve.
   Use the cumulative frequency curve to find



   (a) the median, [1]
   (b) the upper quartile, [1]
   (c) the interquartile range, [1]
   (d) the number of students who spent more than 50 hours using a computer in a week. [2]
   0580/21/O/N/09 Q20)

2. The time, t minutes, 80 students each spend completing their homework is recorded.
   The cumulative frequency diagram shows the results.
   Use the cumulative frequency diagram to find an estimate of
   (a) the median, [1]
   (b) the interquartile range, [2]
   (c) the number of students who spend more than 40 minutes completing their homework. [2]

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0580/22/O/N/18 Q24)

3. The cumulative frequency diagram shows information about the trunk diameter, in metres, of 120 trees.|

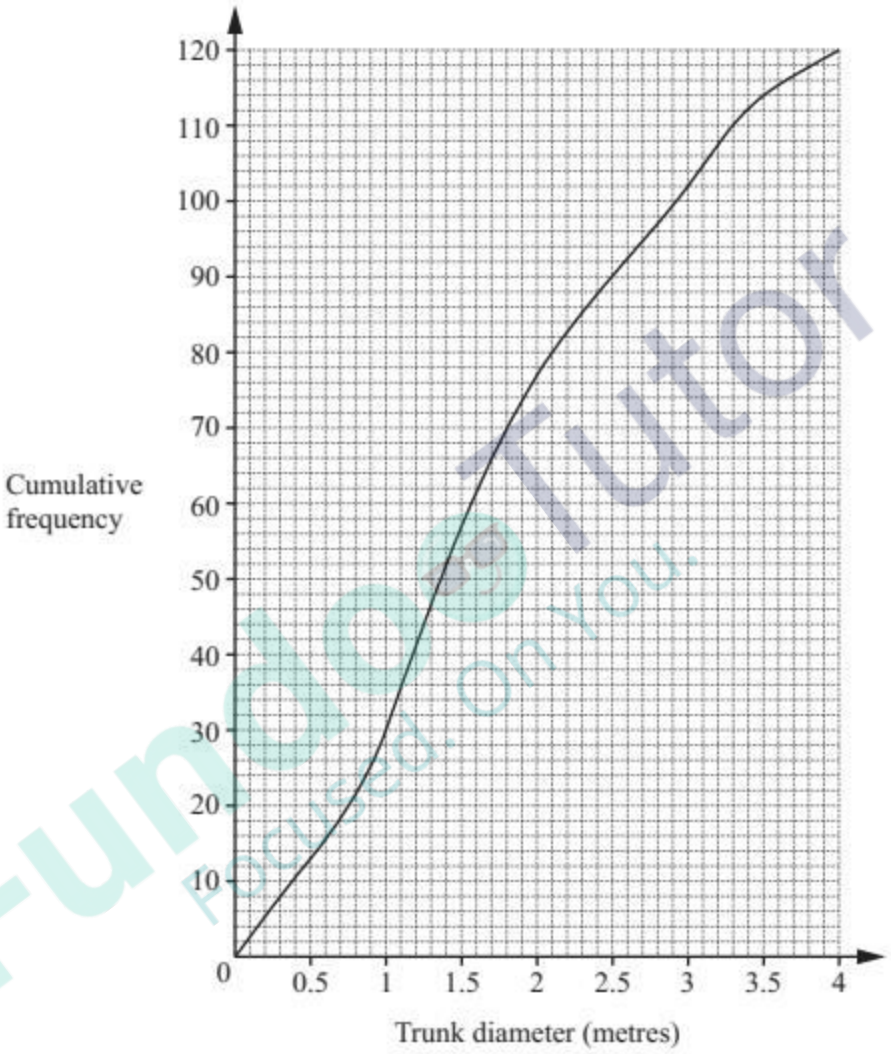
   Find

   (a) the inter-quartile range, [2]

   (b) the 95th percentile, [2]

   (c) the number of trees with a trunk diameter greater than 3 metres. [2]

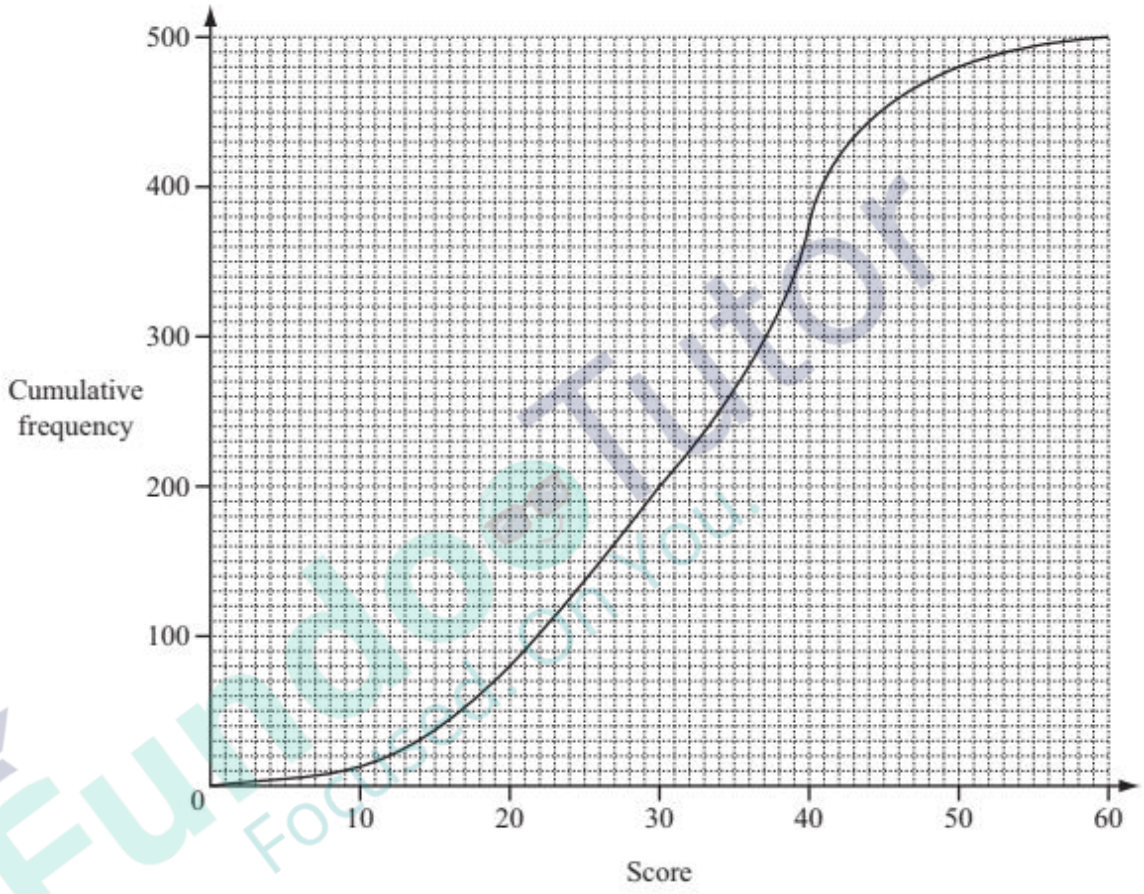
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0580/23/M/J/16 Q22)

4. Jenna draws a cumulative frequency diagram to show information about the scores of 500 people in a quiz.
   Use the diagram to find
   (a) the median score, [1]
   (b) the inter-quartile range, [2]
   (c) the 40th percentile, [1]
   (d) the number of people who scored 30 or less but more than 20. [1]

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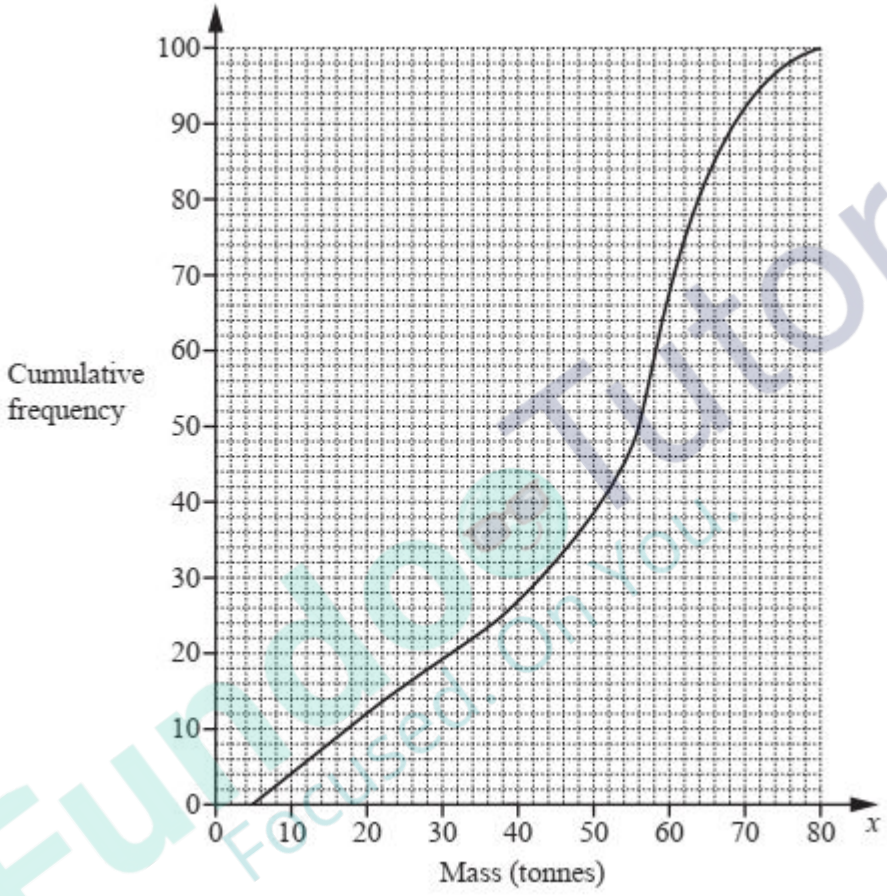


0580/23/M/J/14 Q20)

5. Another factory also recycles metal.
   The mass, x tonnes, of metal is measured each day for a number of days.
   (i) For how 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]

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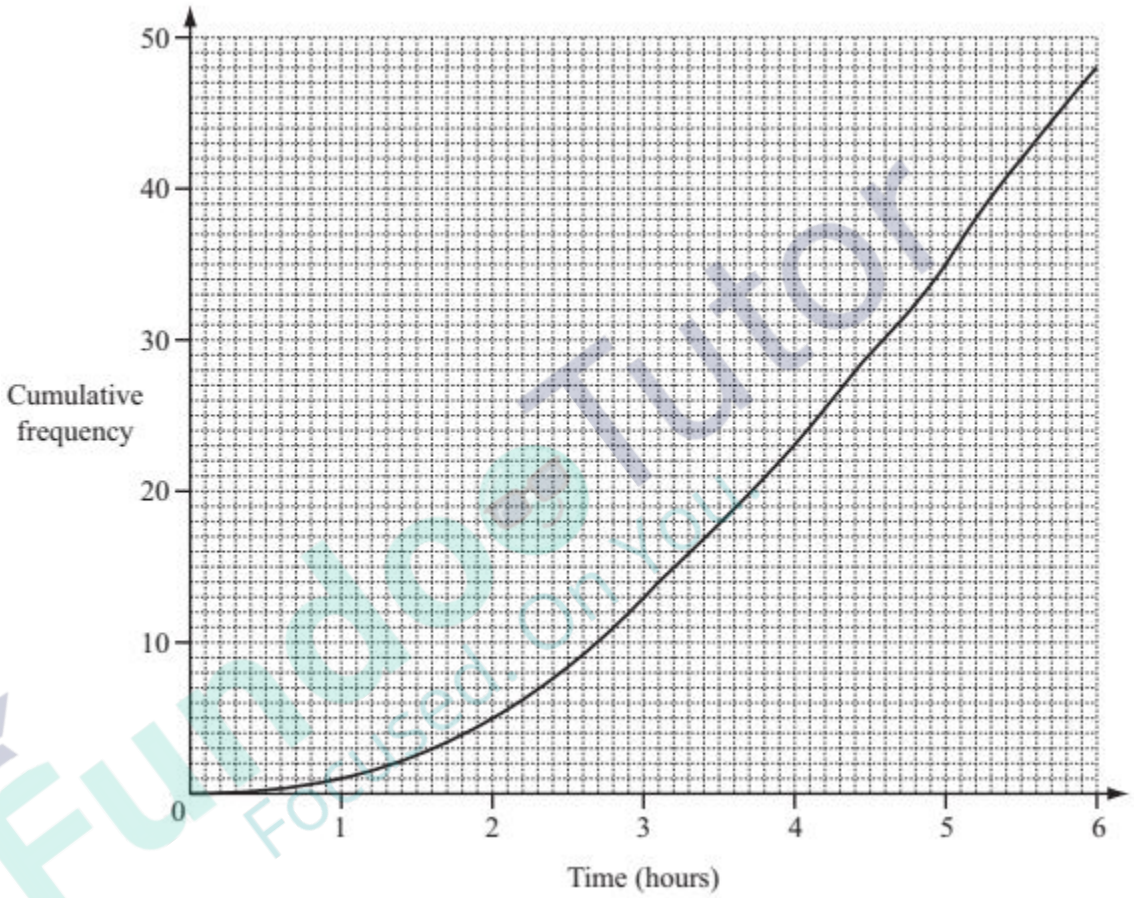
The cumulative frequency diagram shows the results.



0580/43/O/N/18 Q5(b)

6. During one day 48 people visited a museum.
   The length of time each person spent in the museum was recorded.
   The results are shown on the cumulative frequency diagram.
   Work out
   (a) the median, [1]
   (b) the 20th percentile, [2]
   (c) the inter-quartile range, [2]
   (d) the probability that a person chosen at random spends 2 hours or less in the museum. [2]

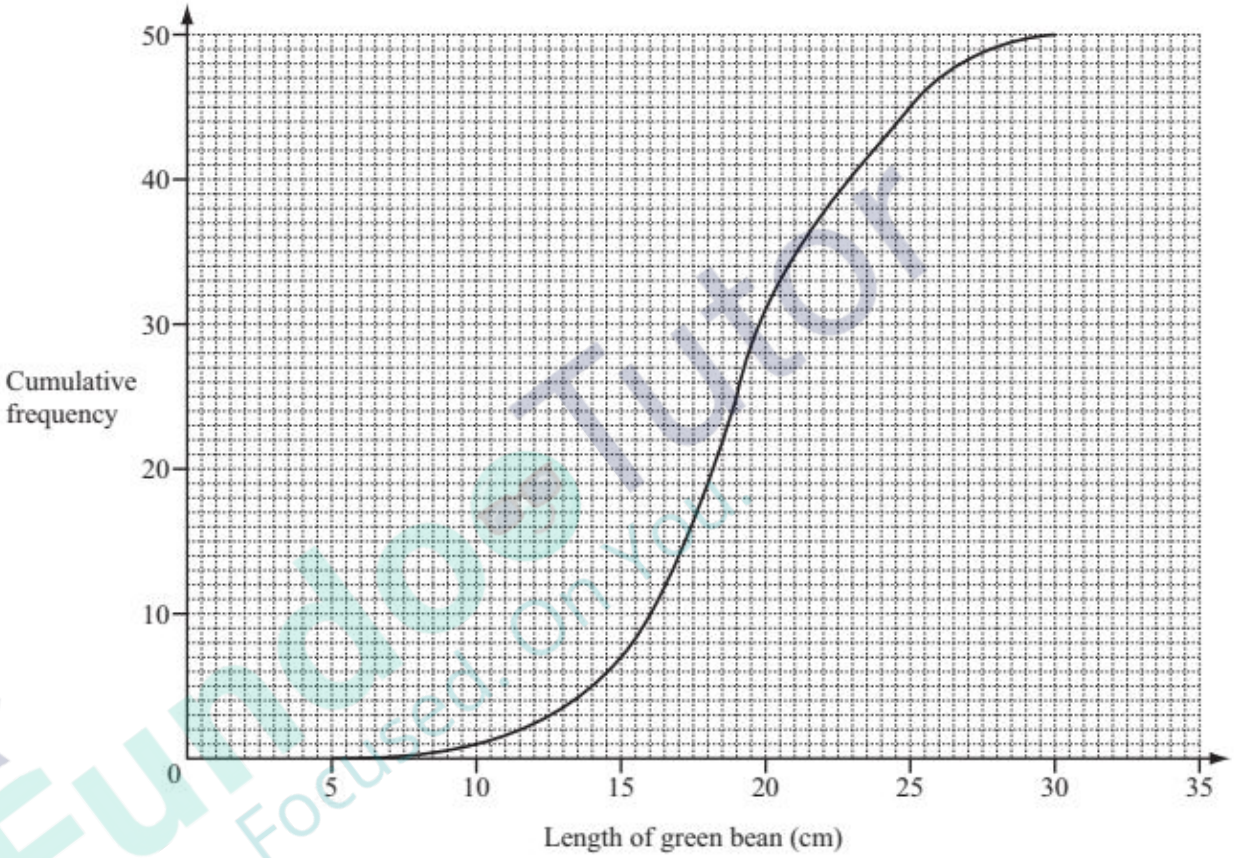
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0580/22/O/N/13 Q20)

7. A gardener measured the lengths of 50 green beans from his garden.
   The results have been used to draw this cumulative frequency diagram.
   Work out
   (a) the median, [1]
   (b) the number of green beans that are longer than 26cm, [2]
   (c) the inter-quartile range, [2]
   (d) the probability that a green bean chosen at random is more than 14cm long. [2]

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0580/23/O/N/13 Q18)

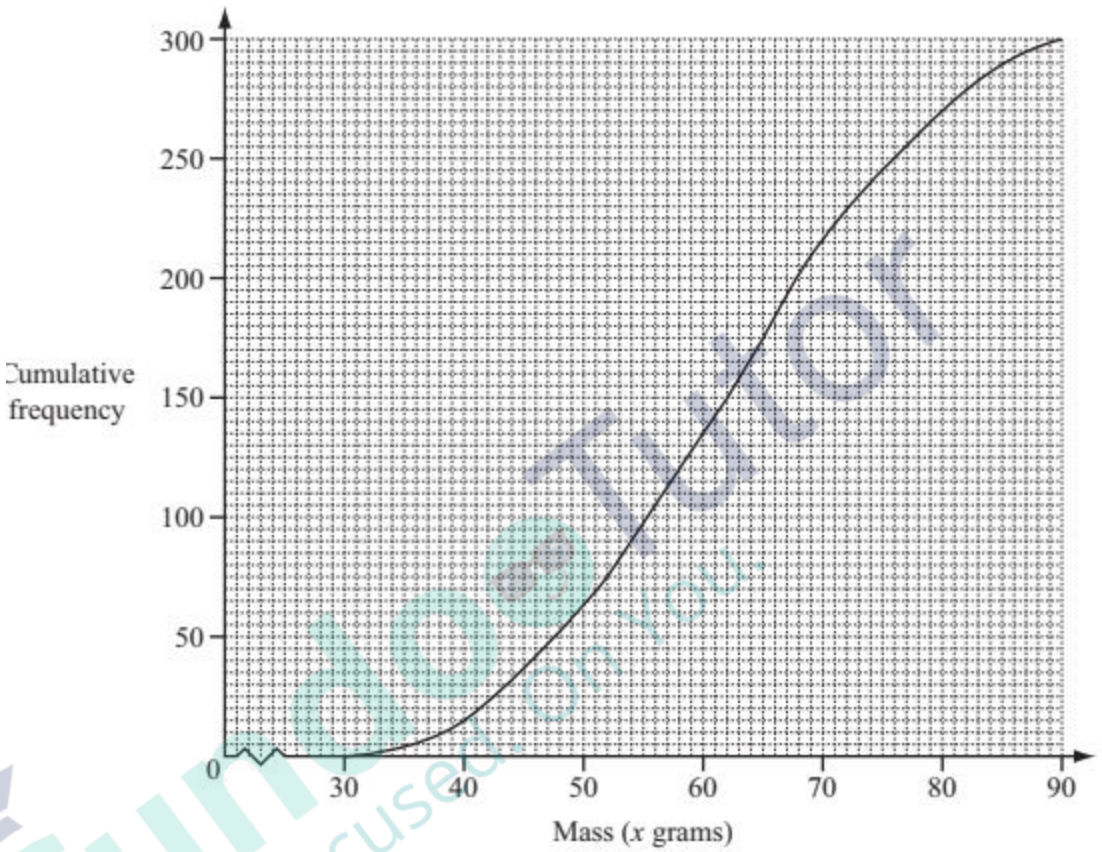
8. Lauris records the mass and grade of 300 eggs. The table shows the results.

Mass (x grams)	$30 < x \leqslant 40$	$40 < x \leqslant 50$	$50 < x \leqslant 60$	$60 < x \leqslant 70$	$70 < x \leqslant 80$	$80 < x \leqslant 90$
Frequency	15	48	72	81	54	30
Grade	small		medium	large	very large	

(a) Find the probability that an egg chosen at random is graded very large.[1]

(b) The cumulative frequency diagram shows the results from the table.

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Use the cumulative frequency diagram to find

(i) the median, [1]

(ii) the lower quartile, [1]

(iii) the inter-quartile range, [1]

(iv) the number of eggs with a mass greater than 65 grams. [2]

0580/21/O/N/12 Q18)

9. 100 students were each asked how much money, $m, they spent in one week.
The frequency table shows the results.

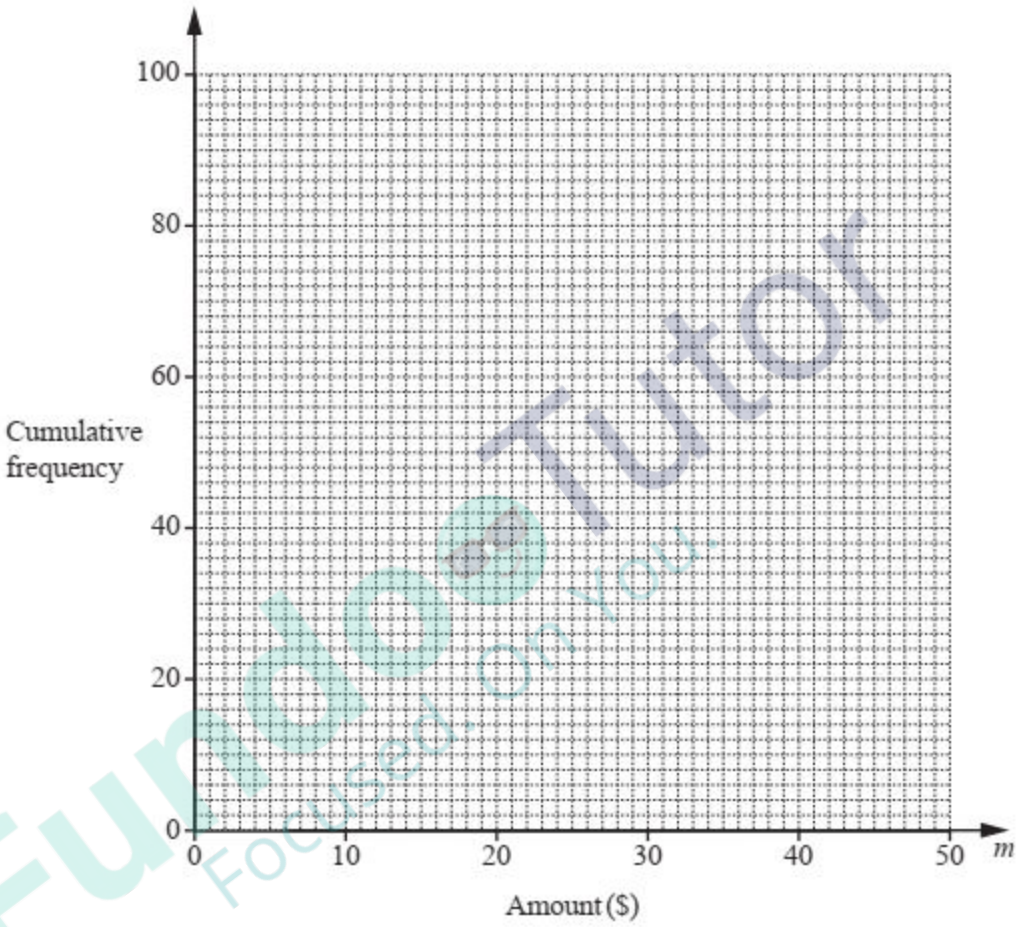
Amount ($m)	$0 < m \leqslant 5$	$5 < m \leqslant 10$	$10 < m \leqslant 20$	$20 < m \leqslant 30$	$30 < m \leqslant 50$
Frequency	16	38	30	9	7

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

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

(a) On the grid, draw the cumulative frequency diagram. [3]

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(b) 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]

0**580/42/M/J/19 Q9**

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

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

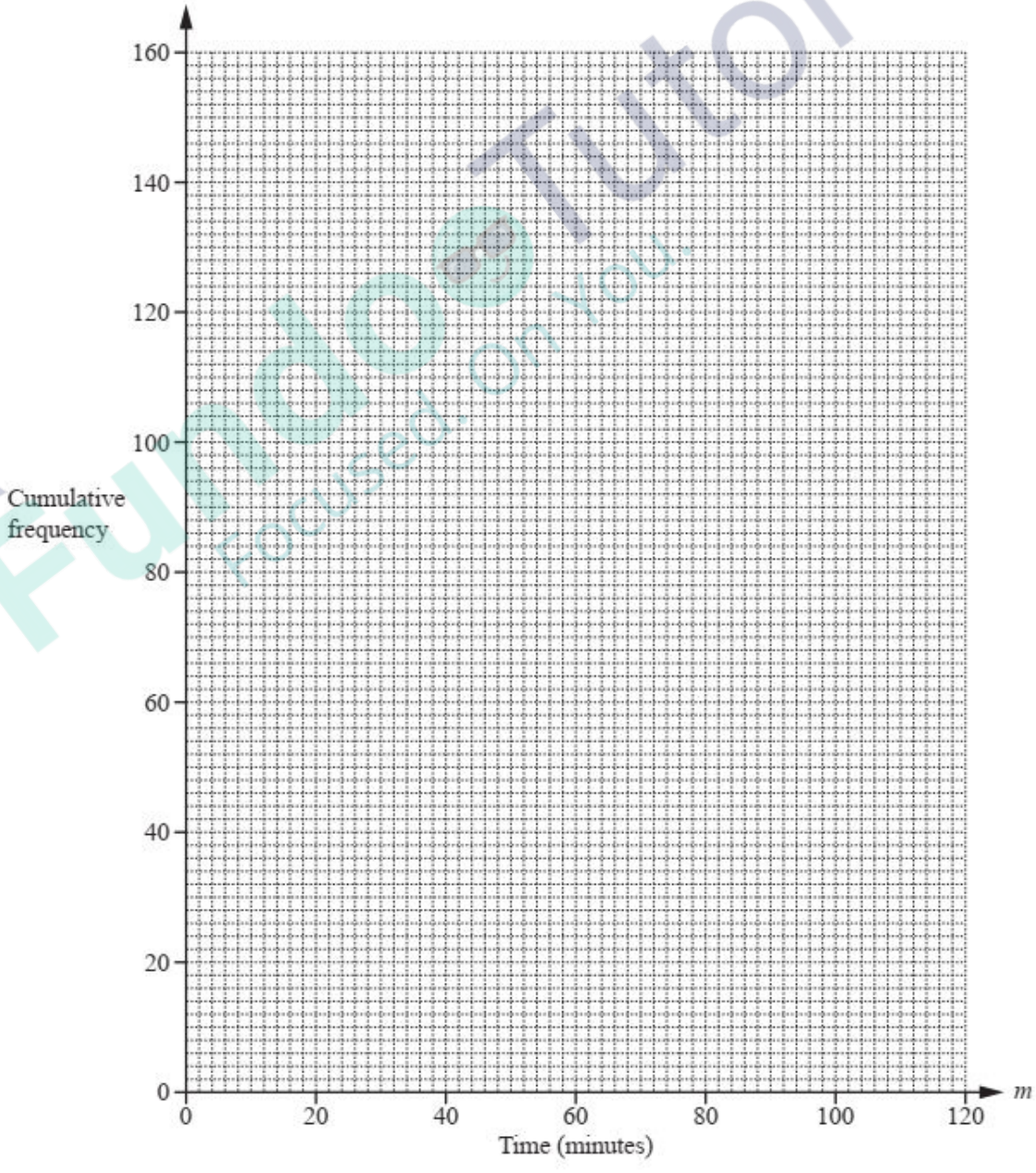
(b) Complete the cumulative frequency table below.

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

[2]

(a) On the grid opposite, draw the cumulative frequency diagram. [3]



[3]

(b) Use your cumulative frequency diagram to find

(i) the median, [1]

(ii) the interquartile range, [2]

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(iii) the 90th percentile, [2]

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

0580/42/F/M/18 Q7)

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

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

Calculate an estimate of the mean time. [4]

(b) (i) Complete the cumulative frequency table for this data [2]

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

(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, [1]

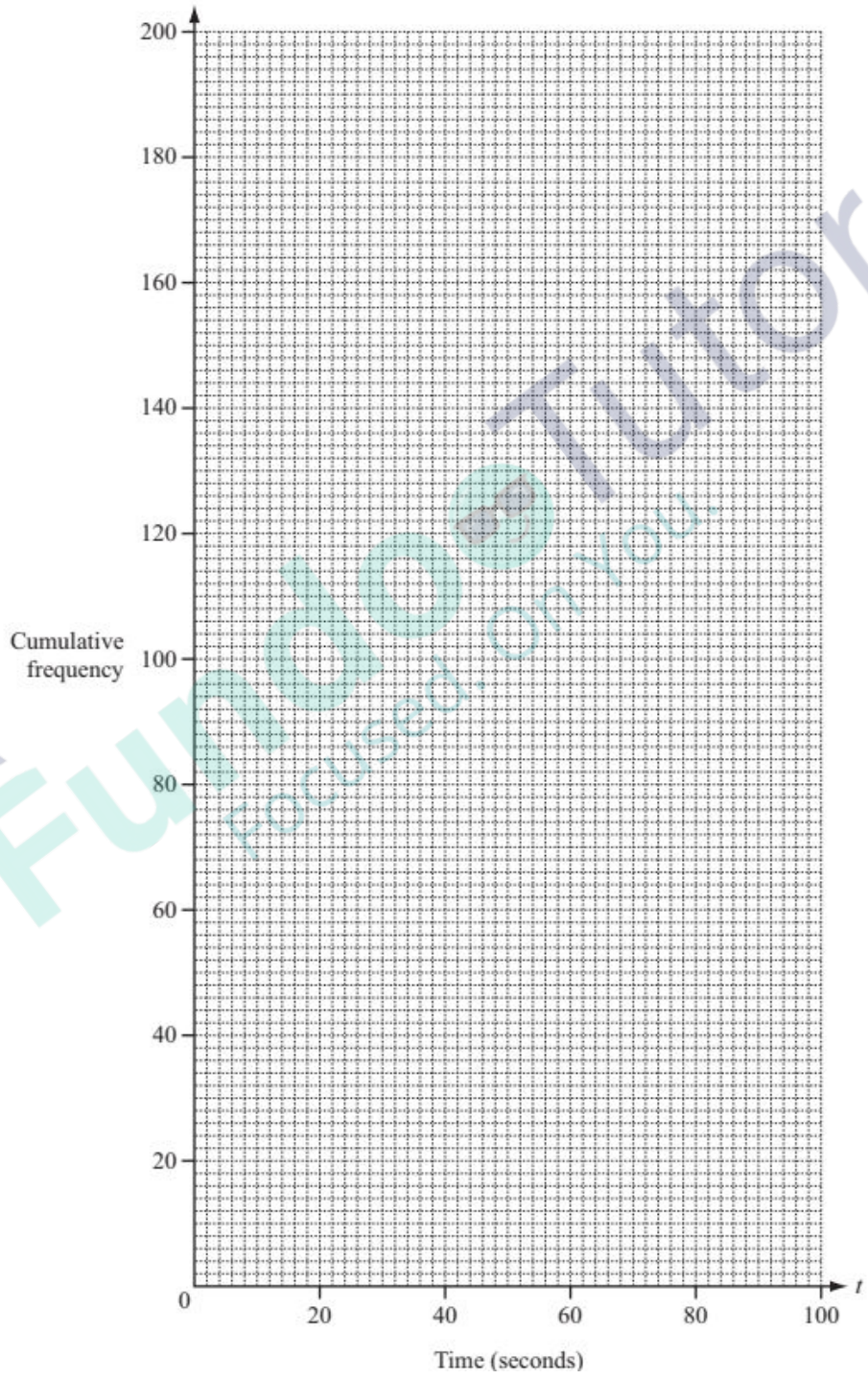
(ii) the lower quartile, [1]

(iii) the inter-quartile range, [1]

(iv) how many people took between 65 and 75 seconds to solve the problem, [1]

(v) how many people took longer than 45 seconds to solve the problem. [2]

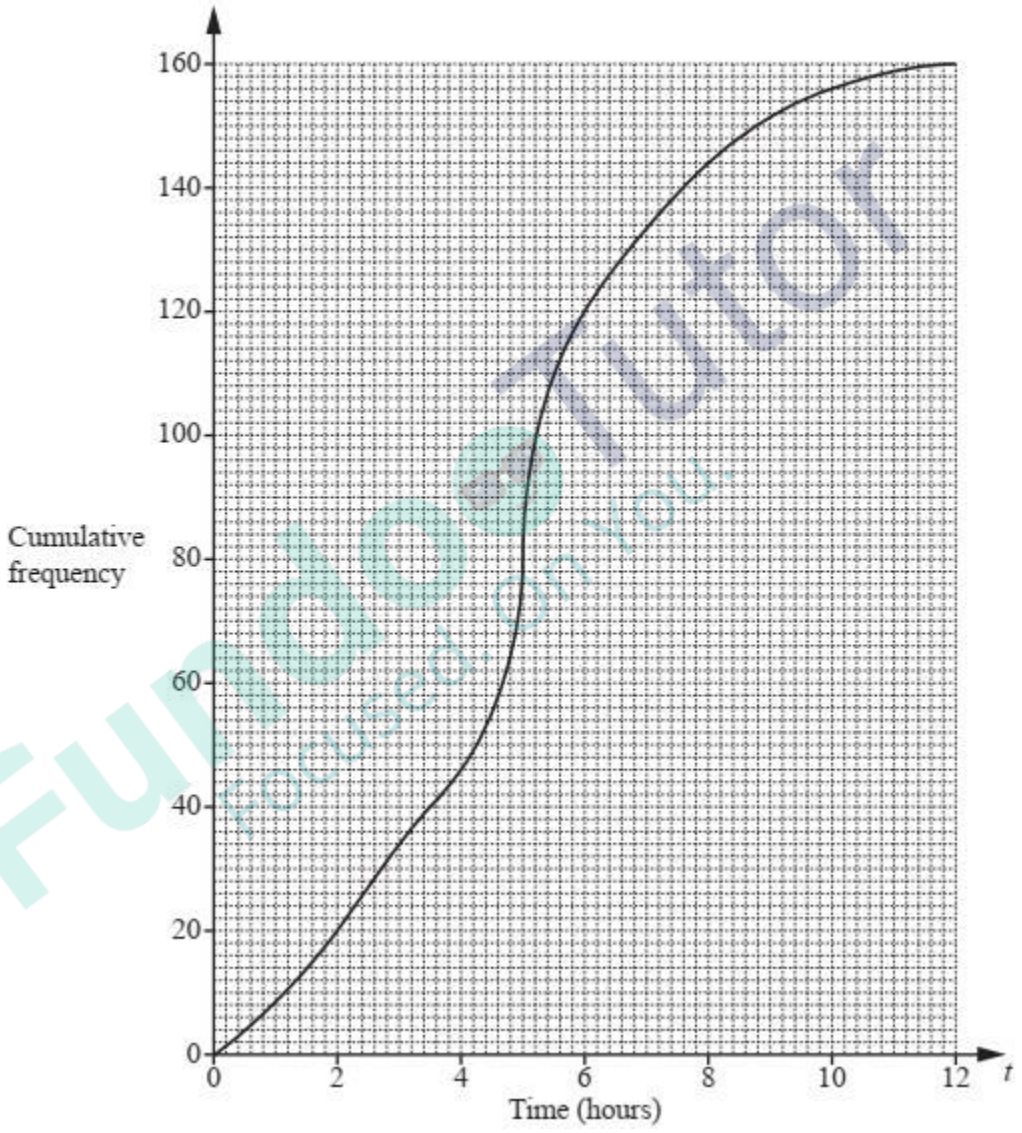
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0580/42/O/N/11 Q5)

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12. 160 students record the amount of time, t hours, they each spend playing computer games in a week. This information is shown in the cumulative frequency diagram.



(a) Use the diagram to find an estimate of

(i) the median, [1]

(ii) the interquartile range. [2]

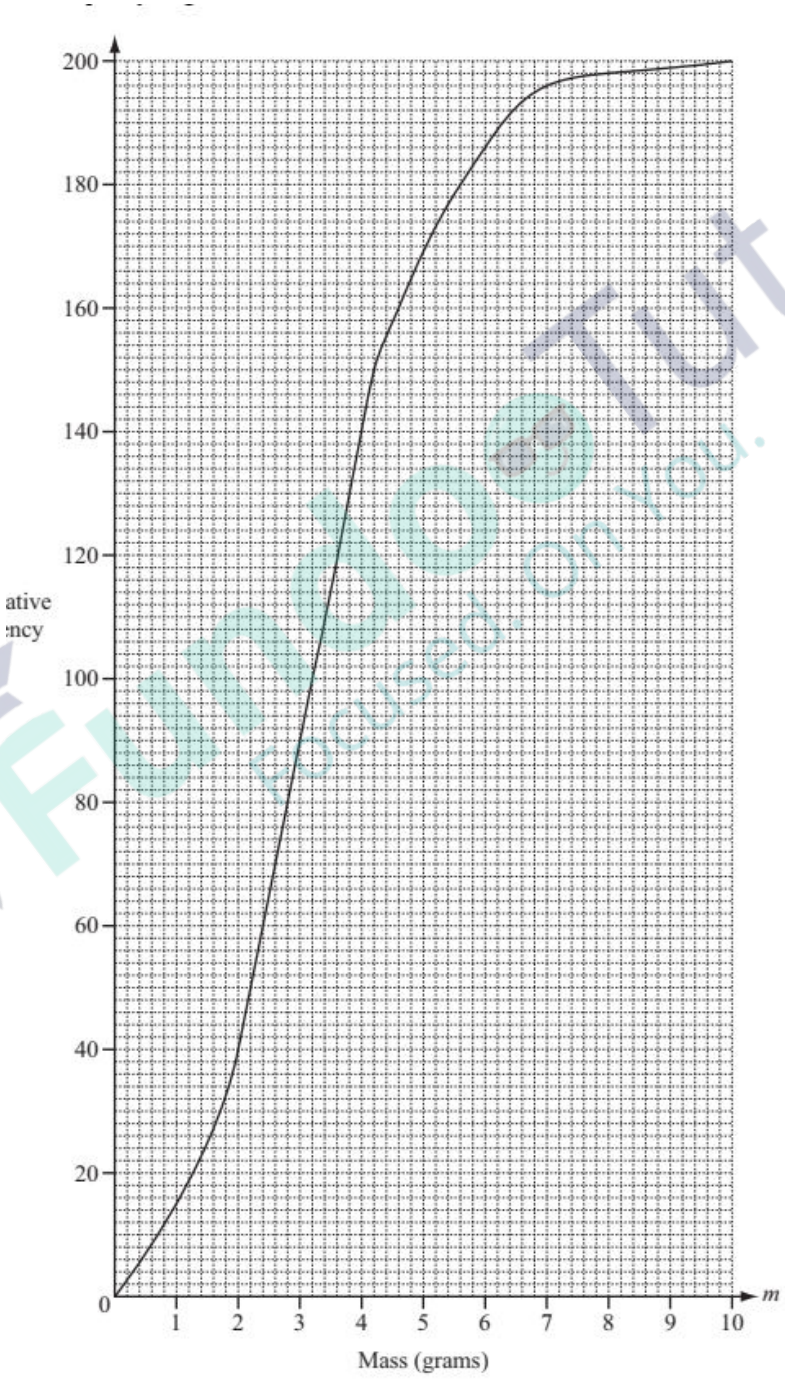
(b) Use the diagram to complete this frequency table. [2]

Time (t hours)	$0 < t \leqslant 2$	$2 < t \leqslant 4$	$4 < t \leqslant 6$	$6 < t \leqslant 8$	$8 < t \leqslant 10$	$10 < t \leqslant 12$
Frequency	20			24	12	4

0580/23/M/J/19 Q23)

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13. 200 students estimate the mass (m grams) of a coin.
The cumulative frequency diagram shows the results.



(a) Find

(i) the median, [1]

(ii) the upper quartile, [1]

(iii) the 80th percentile, [1]

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(iv) the number of students whose estimate is 7g or less. [1]

(b) (i) Use the cumulative frequency diagram to complete the frequency table. [2]

Mass (m grams)	$0 < m \leqslant 2$	$2 < m \leqslant 4$	$4 < m \leqslant 6$	$6 < m \leqslant 8$	$8 < m \leqslant 10$
Frequency	40				2

(ii) A student is chosen at random.

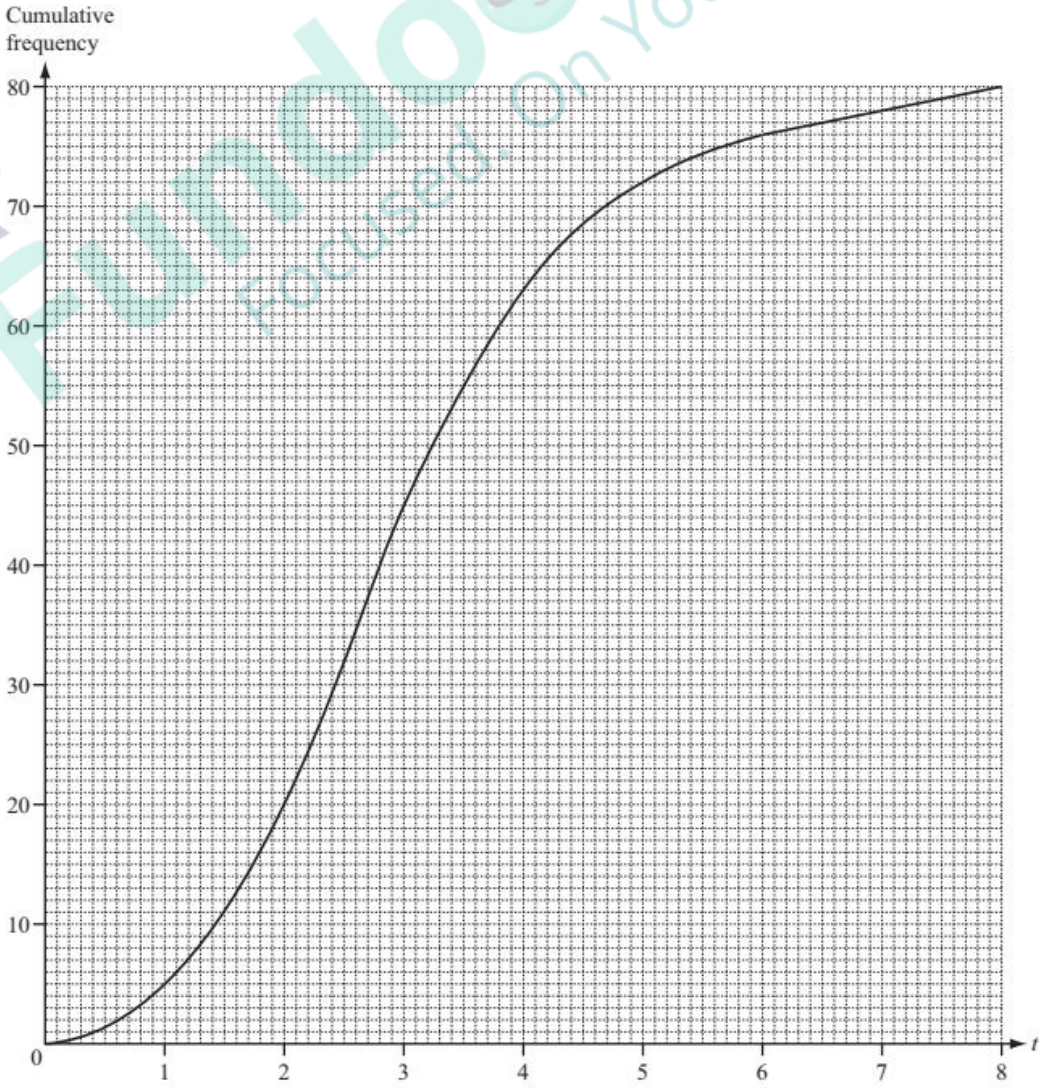
The probability that the student estimates that the mass is greater than M grams is 0.3.

Find the value of M. [2]

0580/41/M/J/13 Q3)

14. Felix asked 80 motorists how many hours their journey took that day.

He used the results to draw a cumulative frequency diagram.

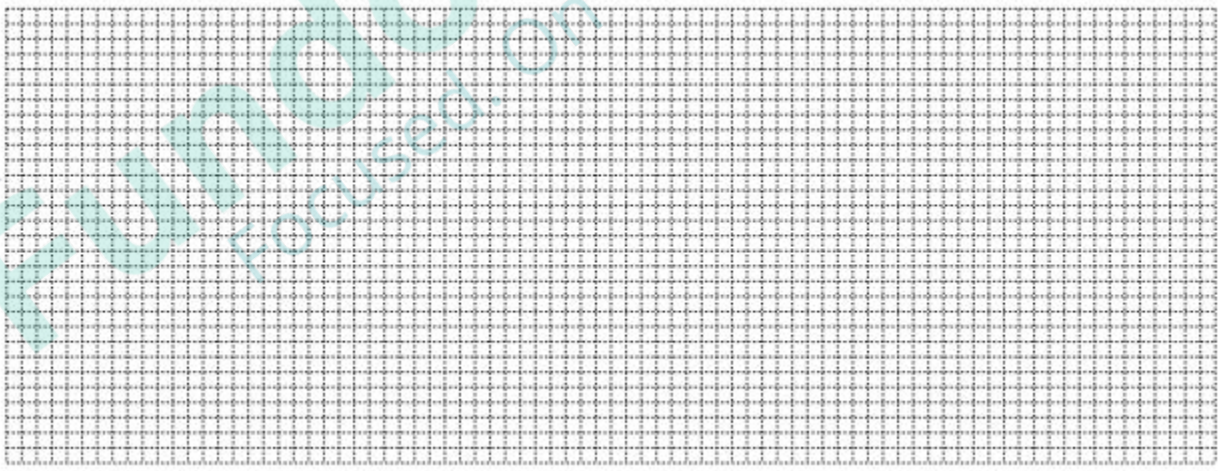


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(a) Find
(i) the median, [1]
(ii) the upper quartile, [1]
(iii) the inter-quartile range. [1]
(b) Find the number of motorists whose journey took more than 5 hours but no more than 7 hours. [1]
(c) The frequency table shows some of the information about the 80 journeys.

Time in hours (t)	$0 < t \leqslant 2$	$2 < t \leqslant 3$	$3 < t \leqslant 4$	$4 < t \leqslant 5$	$5 < t \leqslant 6$	$6 < t \leqslant 8$
Frequency	20	25	18			

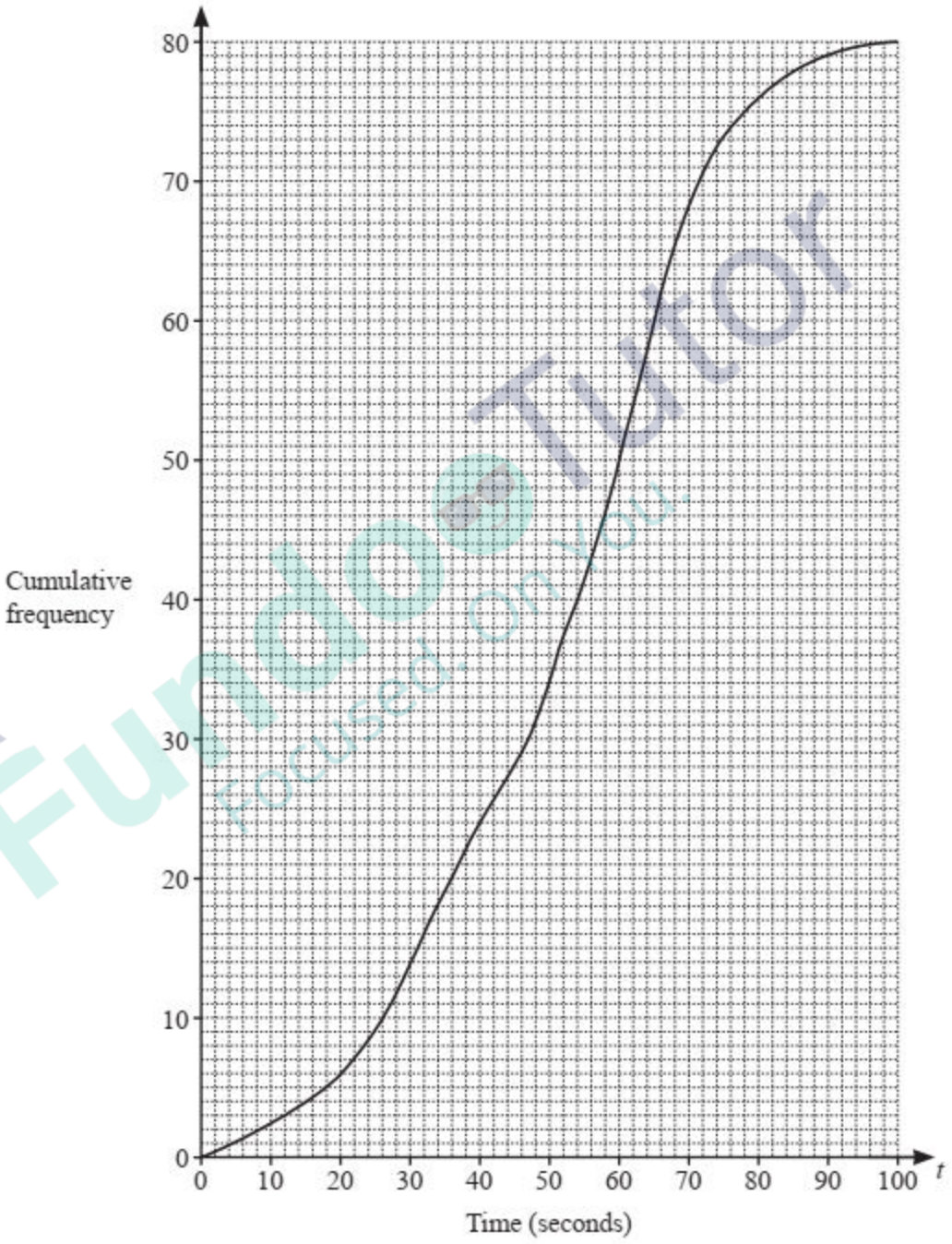
(i) Use the cumulative frequency diagram to complete the table above. [2]
(ii) Calculate an estimate of the mean number of hours the 80 journeys took [4]
(d) On the grid, draw a histogram to represent the information in your table in part (c) [5]



0580/41/M/J/12 Q5)

15. The cumulative frequency diagram shows information about the time taken, t seconds, for a group of girls to each solve a maths problem.
(a) Use the cumulative frequency diagram to find an estimate for
(i) the median, [1]
(ii) the interquartile range, [2]
(iii) the 20th percentile, [1]
(iv) the number of girls who took more than 66 seconds to solve the problem. [2]

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(b) (i) Use the cumulative frequency diagram to complete the frequency table. [2]

Time (t seconds)	$0 < t \leqslant 20$	$20 < t \leqslant 40$	$40 < t \leqslant 60$	$60 < t \leqslant 80$	$80 < t \leqslant 100$
Frequency	6				4

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

(c) A group of boys solved the same problem.

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The boys had a median time of 60 seconds, a lower quartile of 46 seconds and an upper quartile of 66 seconds.

(i) Write down the percentage of boys with a time of 66 seconds or less. [1]

(ii) Howard says

The boys' times vary more than the girls' times.

Explain why Howard is incorrect.

.....

..... [2]

0580/42/O/N/19 Q2)

16. The cumulative frequency diagram shows information about the prices of 100 cars on Website A.

(i) Use the information to complete this table. [2]

Lower quartile	Median	Upper quartile	Inter-quartile range
$	$7600	$	$

(ii) This table shows information about the prices of cars on Website B.

Lower quartile	Median	Upper quartile	Inter-quartile range
$7600	$10 800	$13 600	$6000

Here are two statements comparing the distributions of the prices of cars on Website A and Website B.

For each statement write True or False.

Give a reason for each answer, stating clearly which statistic you use to make your decision.

(a) The prices of cars on Website A are lower than the prices of cars on Website B.

..... because .....

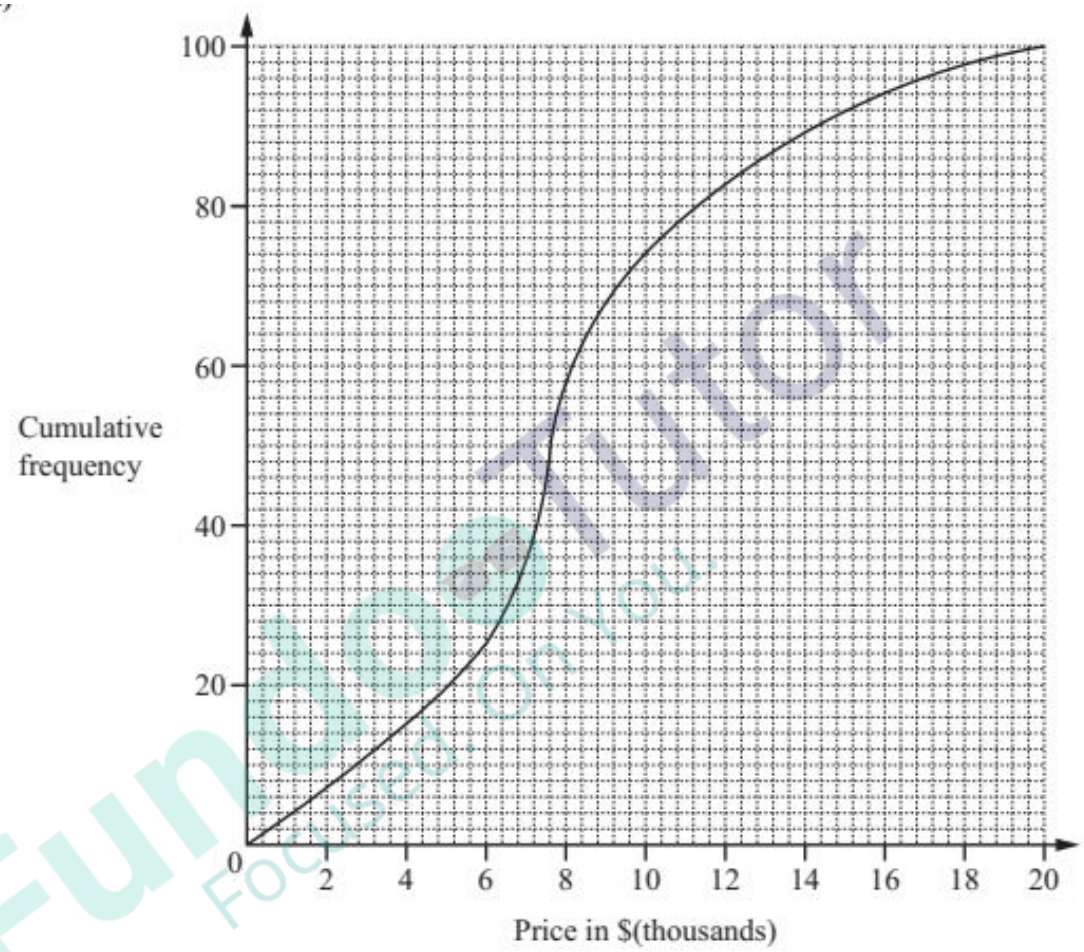
..... [1]

(b) A greater percentage of cars have a price more than $13600 on Website A compared to Website B.

..... because .....

..... [1]

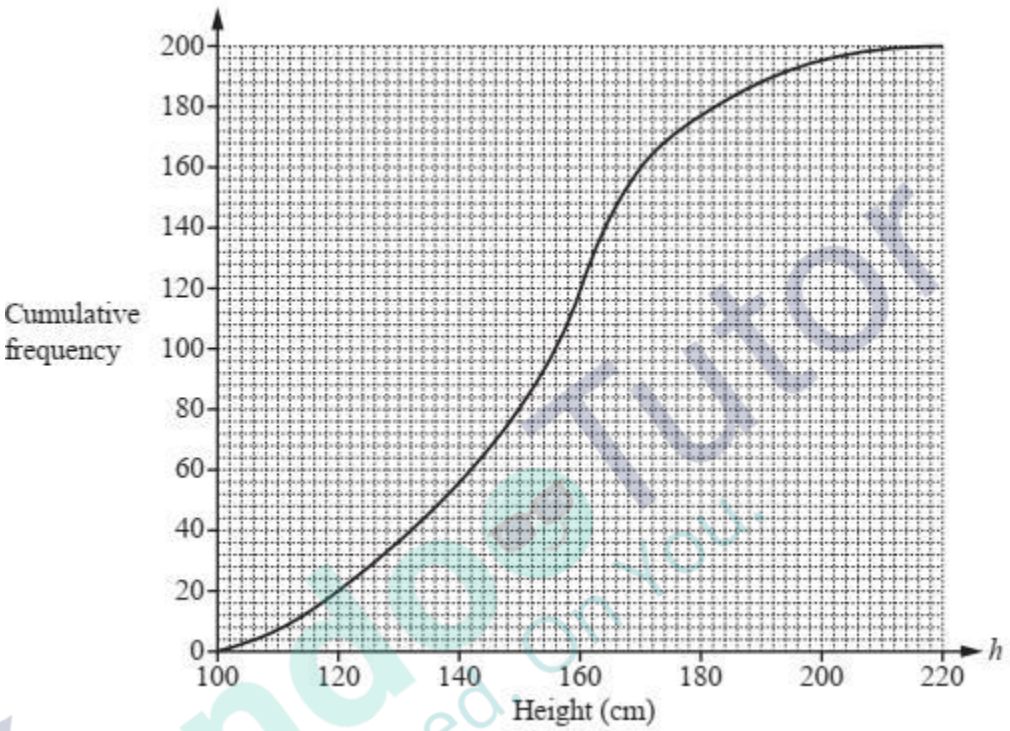
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0580/43/O/N/16 Q7) (a)

17. Simon records the heights, h cm, of 200 sunflowers in his garden.
    The cumulative frequency diagram shows this information.
    (a) Find the number of these sunflowers that have a height of more than 160cm. [2]
    (b) Sue records the heights, hcm, of 200 sunflowers in her garden.
    The cumulative frequency table shows this information.
    On the grid above, draw another cumulative frequency diagram to show this information. [3]
    (c) Work out the difference between the median heights of Simon's sunflowers and Sue's sunflowers. [2]

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Height (h cm)	Cumulative frequency
$h \leqslant 100$	0
$h \leqslant 110$	20
$h \leqslant 120$	48
$h \leqslant 130$	100
$h \leqslant 140$	140
$h \leqslant 150$	172
$h \leqslant 160$	188
$h \leqslant 170$	200

0580/21/O/N/17 Q22)

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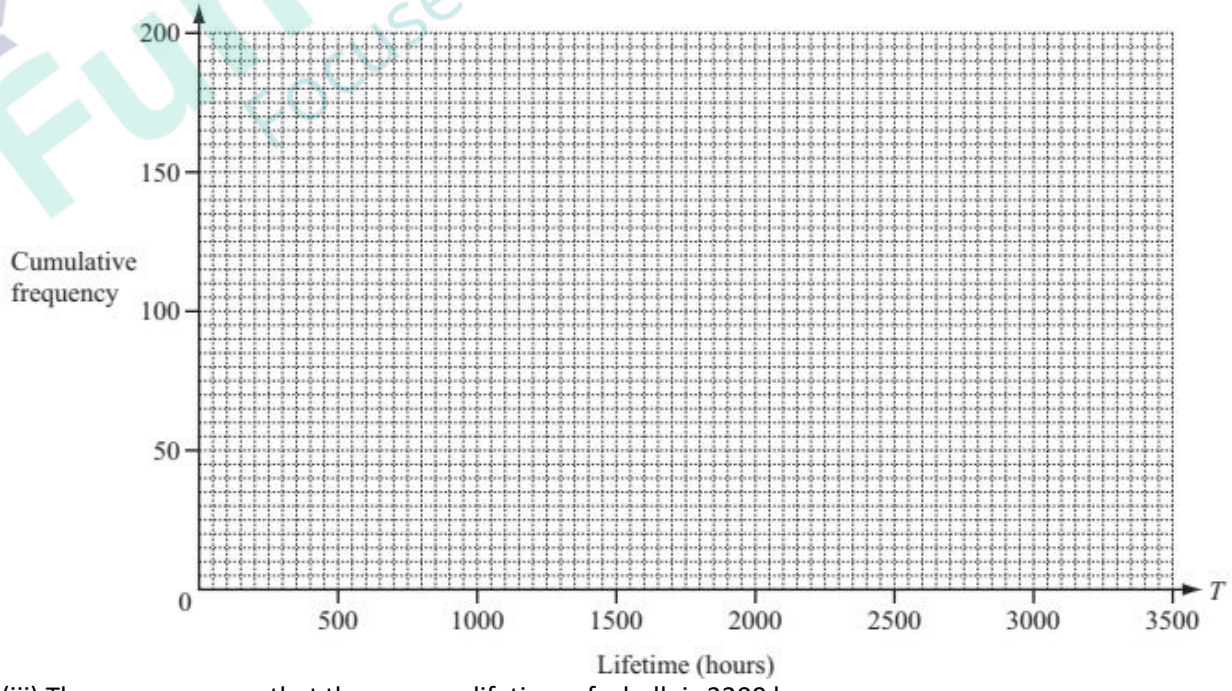
18. A company tested 200 light bulbs to find the lifetime, T hours, of each bulb.
The results are shown in the table

Lifetime (T hours)	Number of bulbs
$0 < T \leqslant 1000$	10
$1000 < T \leqslant 1500$	30
$1500 < T \leqslant 2000$	55
$2000 < T \leqslant 2500$	72
$2500 < T \leqslant 3500$	33

(b) (i) Complete the cumulative frequency table. [2]

Lifetime (T hours)	$T \leqslant 1000$	$T \leqslant 1500$	$T \leqslant 2000$	$T \leqslant 2500$	$T \leqslant 3500$
Number of bulbs					

(ii) On the grid, draw a cumulative frequency diagram to show this information. [3]



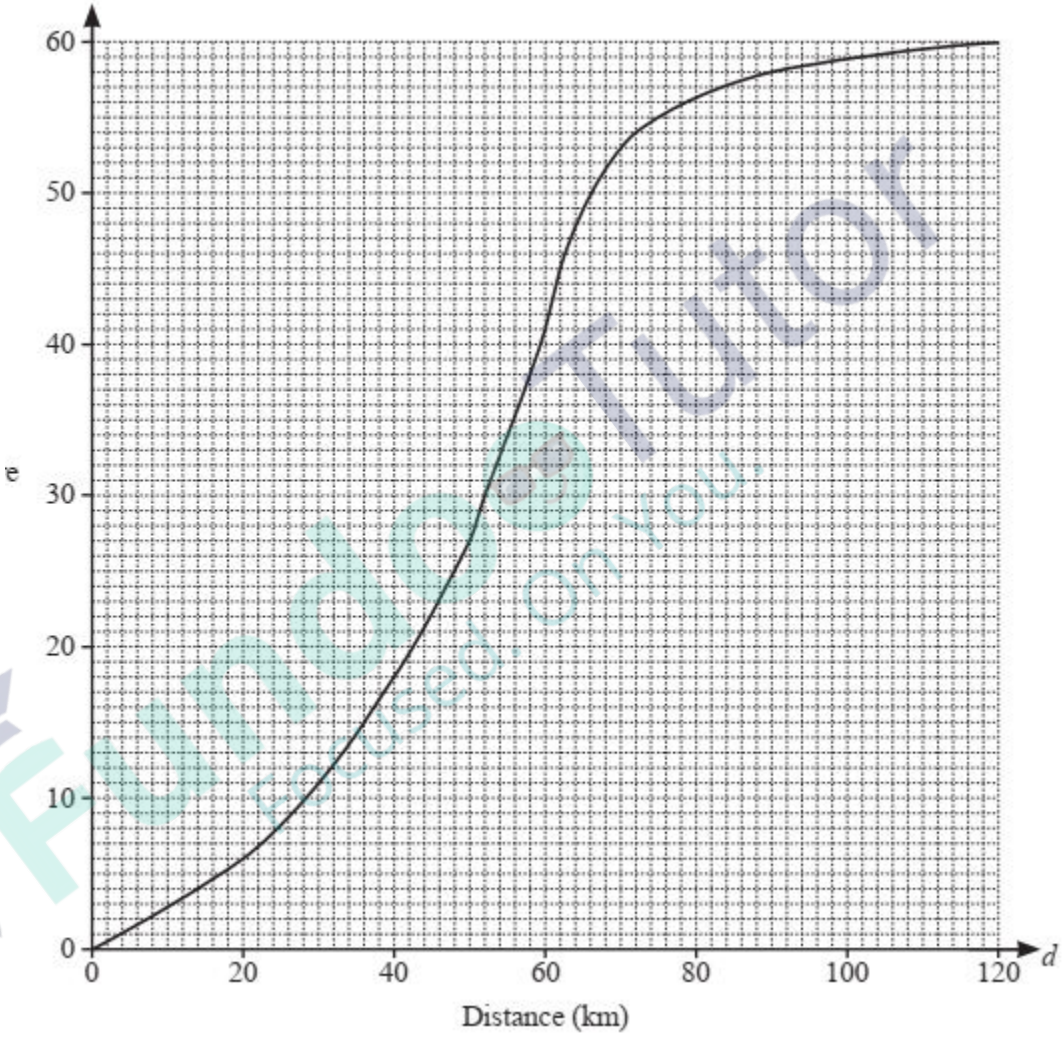
(iii) The company says that the average lifetime of a bulb is 2200 hours.
Estimate the number of bulbs that lasted longer than 2200 hours. [2]

0580/41/O/N/14 Q6(b)

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19. The cumulative frequency diagram shows information about the distance, d km, travelled by each of 60 male cyclists in one weekend.

Q19 – Q20



(a) Use the cumulative frequency diagram to find an estimate of

(i) the median, [1]

(ii) the lower quartile, [1]

(iii) the interquartile range. [1]

(b) For the same weekend, the interquartile range for the distances travelled by a group of female cyclists is 40 km.

Make one comment comparing the distribution of the distances travelled by the males with the distribution of the distances travelled by the females.

.....

..... [1]

(c) A male cyclist is chosen at random.

Find the probability that he travelled more than 50 km. [2]

(d) (i) Use the cumulative frequency diagram to complete this frequency table. [2]

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Distance ($d$km)	Number of male cyclists
$0 < d \leqslant 40$	18
$40 < d \leqslant 50$	9
$50 < d \leqslant 60$	
$60 < d \leqslant 70$	
$70 < d \leqslant 90$	
$90 < d \leqslant 120$	2

(ii) Calculate an estimate of the mean distance travelled. [4]

0580/43/O/N/19 Q5)

20. The table shows the times taken, in minutes, by 150 students to complete their homework on one day.

Time (t mins)	$0 < t \leqslant 20$	$20 < t \leqslant 35$	$35 < t \leqslant 45$	$45 < t \leqslant 55$	$55 < t \leqslant 70$	$70 < t \leqslant 80$
Frequency	6	15	19	37	53	20

(a) (i) In which interval is the median time? [1]

(ii) Using the mid-interval values 10, 27.5, ……..calculate an estimate of the mean time. [3]

(b) (i) Complete the table of cumulative frequencies. [2]

Time (t mins)	$t \leqslant 20$	$t \leqslant 35$	$t \leqslant 45$	$t \leqslant 55$	$t \leqslant 70$	$t \leqslant 80$
Cumulative frequency	6	21				

(ii) On the grid, label the horizontal axis from 0 to 80, using the scale 1cm represents 5 minutes and the vertical axis from 0 to 150, using the scale 1 cm represents 10 students.

Draw a cumulative frequency diagram to show this information. [5]

(c) Use your graph to estimate

(i) the median time [1]

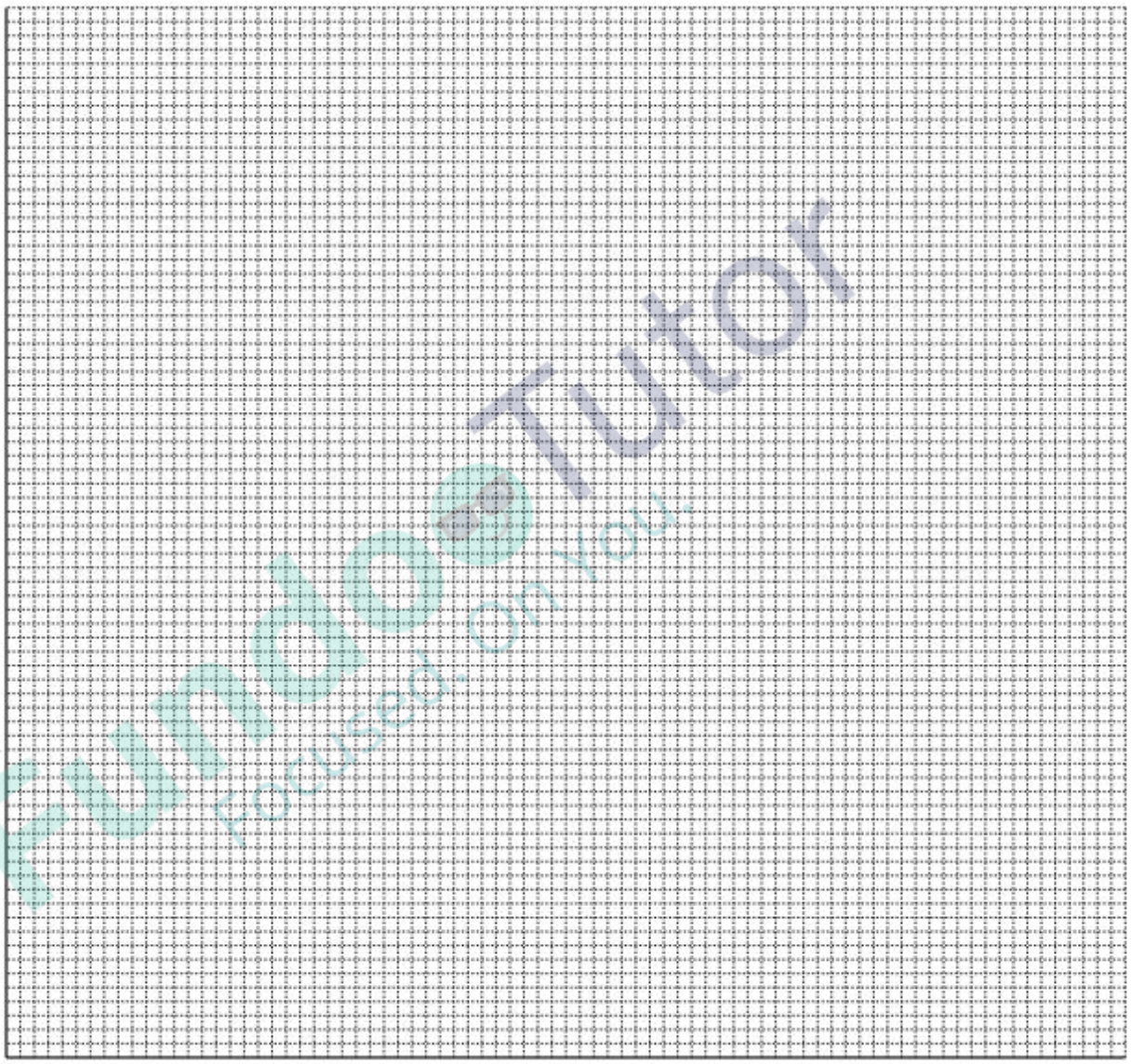
(ii) the inter-quartile range, [2]

(iii) the number of students whose time was in the range $50 < t \leq 60$, [1]

(iv) the probability, as a fraction, that a student, chosen at random, took longer than 50 minutes,[2]

(v) the probability, as a fraction, that two students, chosen at random, both took longer than 50 minutes. [2]

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0580/42/M/J/11 Q6)

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Answer

1) (a) 38 (b) 45 to 46 (c) 15 to 16 (d) 10 or 11	11) (a) 63.45 or 63.5(b) (i) 75 117 195 200 (c) (i) 65 to 67 (ii) 52 to 55 (iii) 21 to 24 (iv) 44 to 52 (v) (v) Integer value of 200 – reading at 45 secs
2) (a) 25 (b) 12 (c) 5	12) (a)(i) 5 (a)(ii) 2.4 to 2.6 (b) 26, 74
3) (a) 1.5 (b) 3.5 (c) 18	13) (a) (i) 3.2 (ii) 4.2 (iii) 4.6 (iv) 196 (b) (i) 100, 46, 12 (ii) 4
4) (a) 34 (b) 16 (c) 30 (d) 120	14) (a) (i) 2.8 (ii) 3.8 (iii) 1.8 (b) 6 (c) (i) 9, 4, 4 (ii) 2.95 (d)correct histogram with heights 10, 25, 18, 9, 4, 2
5) (i) 100 (ii) 56 (iii) 62 (iv) 24 (v) 88	15) (a)(i) 54 (ii) 29 (iii) 32 (iv) 17, 18 or 19 (b)(i) 18, 26, 26 (ii) 51 (c)(i) 75 (ii) IQR is bigger for the girls with [boys =] 20 seen oe
6) (a) 4.05 to 4.2 (b) 2.6 to 2.75 (c) 2.05 to 2.25 (d)5/48	16) (i) 6000 [7600] 10200 4200 (ii)(a) True, median price is lower (ii)(b) False, A's UQ < 13600
7) (a) 19–19.1 (b) 3 (c) 4.9 to 5.7 (d) 45/50	17) (a) 80 to 84 (c) 26
8) (a)7/25 (b) (i) 62 (ii) 52 (iii) 19 to 20 (iv) 125	18) (i) 10, 40, 95, 167, 200 (iii) 68 to 80
9) (b) 54 84 93 (d) (i) 9 to 9.8 (ii) 8.5 to 11.5 (iii) 10, 11 or 12	19) (a)(i) 52 (ii) 36 (iii) 26 (b) e.g. distances for females are more varied (c)11/20 (d)(i) 14 12 5 (d)(ii) 48.75
10) (b) [3 42] 85 140 151 160 (d)(i) 57 to 59 (d)(ii) 36 to 42 (d)(iii) 92 to 94 (d)(iv) 130 to 137	20) (a) (i) $45 < t \leq 55$ (ii) 52.6 (b) (i) 40, 77, 130, 150 (c) (i) 54 to 55 (ii) 18.5 – 22.5 (iii) Their reading at 60 – their reading at 50 (iv) (150 – their reading at 50)/150 (v) if answer to (iv) is k/150 then k/150 x (k-1)/149

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