CUMULATIVE FREQUENCY ANS STATISTICAL MEASURES

NAME

Question 1

The table gives information about the number of kilometres that Ted cycled on each of the 30 days in April.

Number of kilometres (K)		Frequency	
$0 \leqslant K < 5$	2.5 x	8	20
$5 \leqslant K < 10$	7.5 x	7	52.5
$10 \leqslant K < 15$	12.5 x	3	37.5
$15 \leqslant K < 20$	17.5 x	10	175
$20 \leqslant K < 25$	22.5 x	2	45

Calculate an estimate for the mean number of kilometres that Ted cycled on each day in April.

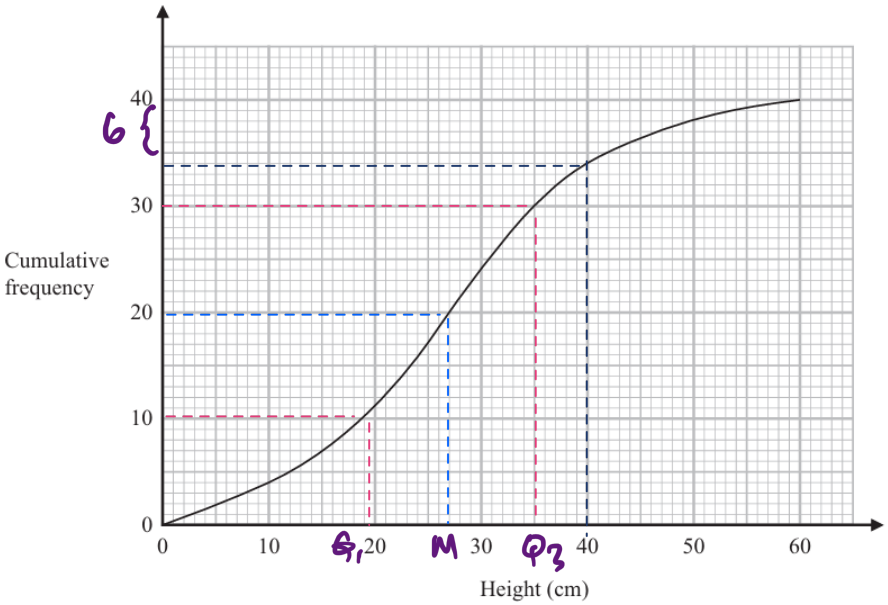
$$\text{Estimate} = \frac{330}{30}$$

$= 11$

(4)

Question 2

The cumulative frequency graph shows information about the heights of 40 plants that Greta has grown.



(a) Use the graph to find an estimate for the median height.

27 cm

(1)

(b) Use the graph to find an estimate for the interquartile range of the heights.

IQR = 35 − 19

16 cm

(2)

Plants with a height greater than 40 cm are premium plants.
Greta sells all the premium plants for 30 euros each.

(c) Work out the total amount of money Greta receives for the premium plants.

6 × 30

180 euros

.....(2)

Question 3

e, f and g represent integers such that

e f 7 g 12 17

is a list of integers written in order of size.

The integers have

a range of 15
a median of 8.5
a mean of 9

Work out the value of e, the value of f and the value of g

$e =$ .....

$f =$ .....

$g =$ .....

(3)

Question 4

Ivan asked 15 people how many books they read last year.

Here are his results.

1 1 3 4 6 7 8 9 10 12 15 25 30 37 50

Work out the interquartile range of the number of books read.

.....

(2)

Question 5

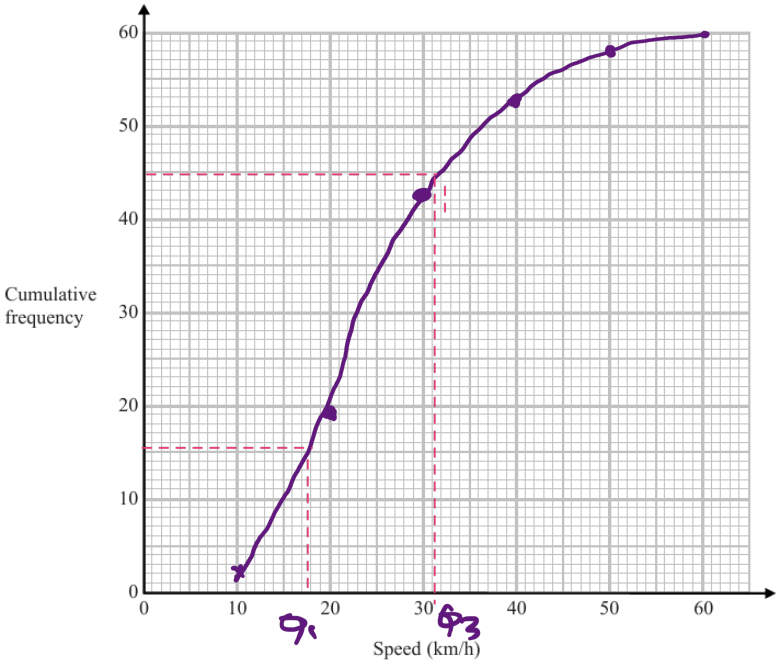
The table shows information about the speeds of 60 cycles.

Speed (s km/h)	Frequency
$0 < s \leqslant 10$	3
$10 < s \leqslant 20$	16
$20 < s \leqslant 30$	24
$30 < s \leqslant 40$	10
$40 < s \leqslant 50$	5
$50 < s \leqslant 60$	2

(a) Complete the cumulative frequency table.

Speed (s km/h)	Cumulative frequency
$0 < s \leqslant 10$	
$0 < s \leqslant 20$	
$0 < s \leqslant 30$	
$0 < s \leqslant 40$	
$0 < s \leqslant 50$	
$0 < s \leqslant 60$	

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



(2)

(c) Use your graph to find an estimate for the interquartile range of the speeds.

31 − 17 = 14

(2)

Question 6

The table shows information about the weights, in kilograms, of 40 babies.

Weight (w kg)		Frequency
$2 < w \leqslant 3$	×	12
$3 < w \leqslant 4$	×	16
$4 < w \leqslant 5$	×	9
$5 < w \leqslant 6$	×	2
$6 < w \leqslant 7$	×	1

mid point: 2.5, 3.5, 4.5, 5.5, 6.5

midpoint × frequency: 30, 56, 40.5, 11, 6.5

sum: 144

(a) Write down the modal class.

$3 < w \leqslant 4$

(1)

(b) Work out an estimate for the mean weight of the 40 babies.

Estimate = $144 \div 40$

$= 3.6$

..... kg

(4)

One of the 40 babies is going to be chosen at random.

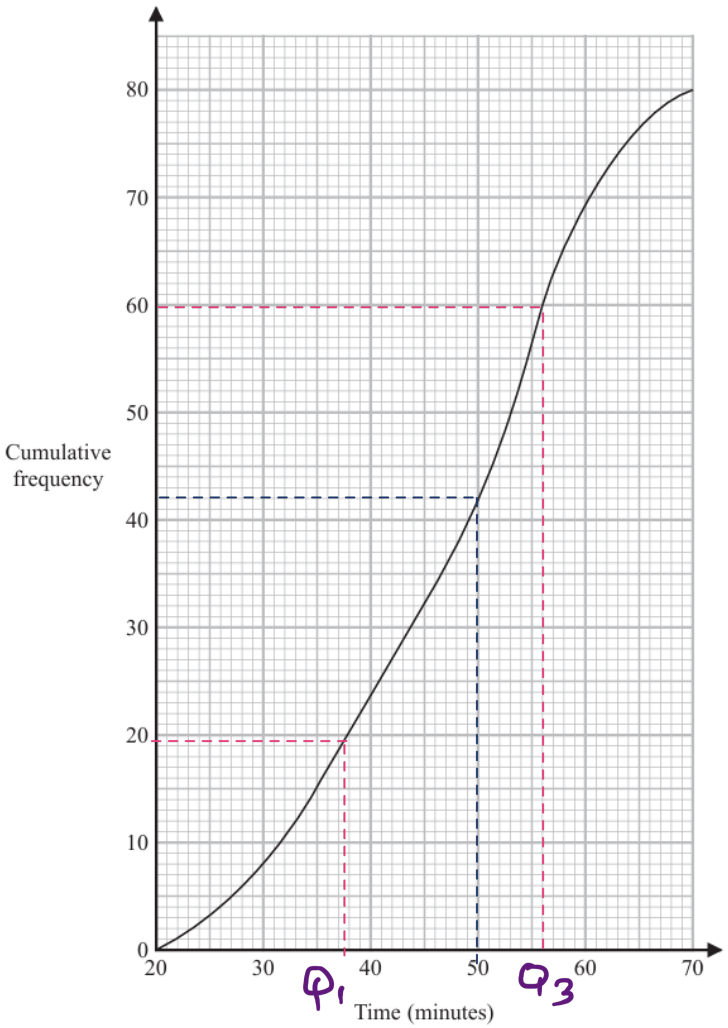
(c) Find the probability that this baby has a weight of more than 5 kg.

$\frac{3}{40}$

(2)

Question 7

A total of 80 men and women took part in a race.
The cumulative frequency graph gives information about the times, in minutes, they took for the race.



(a) Use the graph to find an estimate for the interquartile range.

IQR = 56 − 38

18 minutes

(2)

60% of the men took 50 minutes or less for the race.
No women took 50 minutes or less for the race.

(b) Work out an estimate for the number of men who took part in the race.

men less than 50 mins = 42

60% = 42 $\Rightarrow \frac{x}{42} = \frac{100}{60}$

100% = x

$x = 70$ men.

(3)

Question 8

Step 1 Find midpoints

The table gives information about the distances 100 adults travel to work.

Distance (d km)	Frequency		
$0 < d \leqslant 5$	26	2.5	65
$5 < d \leqslant 10$	40	7.5	300
$10 < d \leqslant 15$	16	12.5	200
$15 < d \leqslant 20$	10	17.5	175
$20 < d \leqslant 25$	8	22.5	180

Sum = 920

(a) Write down the modal class.

$5 < d \leq 10$

(1)

(b) Work out an estimate for the mean distance.

Estimate = $920 \div 80$

$= 9.2$ km

Question 9

The frequency table gives information about the times, in minutes, that 60 people took to complete a puzzle.

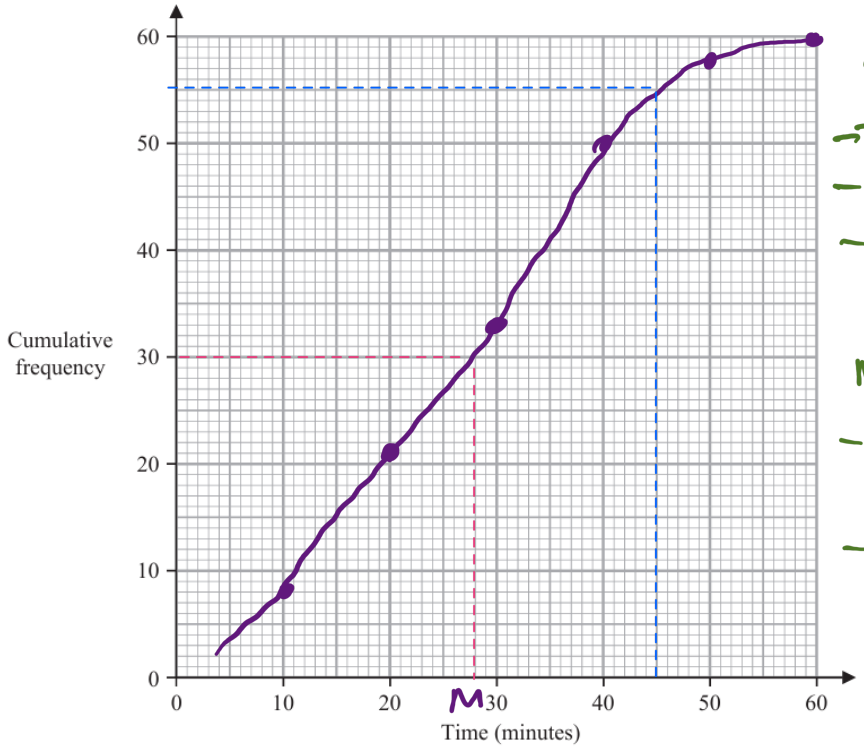
Time (t minutes)	Frequency
$0 < t \leqslant 10$	8
$10 < t \leqslant 20$	13
$20 < t \leqslant 30$	12
$30 < t \leqslant 40$	17
$40 < t \leqslant 50$	7
$50 < t \leqslant 60$	3

(a) Complete the cumulative frequency table.

Time (t minutes)	Cumulative frequency
$0 < t \leqslant 10$	8
$0 < t \leqslant 20$	21
$0 < t \leqslant 30$	33
$0 < t \leqslant 40$	50
$0 < t \leqslant 50$	57
$0 < t \leqslant 60$	60

(1)

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



Median
- $\frac{1}{2}$ of cumulative f
- Draw line across
- take reading on horizontal axis

More than 45 min
- On horizontal go to 45 mins
- Draw line up to graph
  - go across
  - subtract value from 60 (total CF)

(2)

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

28 minutes

(1)

(d) Use your graph to find an estimate for the number of these people who took more than 45 minutes to complete the puzzle.

60 − 55 = 5 took more than 45 mins

(2)

Question 10

The table shows some information about the hourly rates of pay of 60 workers.

Hourly rate of pay (p dollars)	Frequency
$10 < p \leqslant 15$	18
$15 < p \leqslant 20$	16
$20 < p \leqslant 25$	14
$25 < p \leqslant 30$	8
$30 < p \leqslant 35$	4

12.5 17.5 22.5 27.5 32.5

225 280 315 220 130

1170

(a) Write down the modal class.

$10 < p \leqslant 15$

(1)

(b) Work out an estimate for the mean hourly rate of pay of the 60 workers.

mean = 1170 ÷ 60

=

19.5 dollars

(4)

Question 11

The frequency table gives information about the weights, in kilograms, of 60 parcels in a delivery van.

Weight (w kilograms)	Frequency
$0 < w \leqslant 1$	4
$1 < w \leqslant 2$	15
$2 < w \leqslant 3$	20
$3 < w \leqslant 4$	11
$4 < w \leqslant 5$	6
$5 < w \leqslant 6$	4

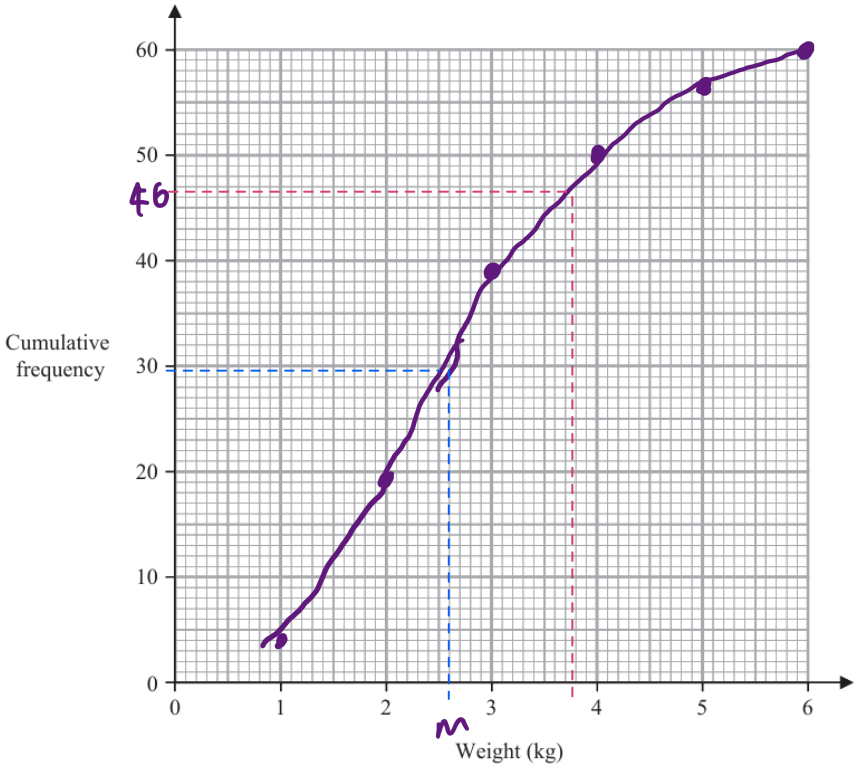
(a) Complete the cumulative frequency table.

Weight (w kilograms)	Cumulative frequency
$0 < w \leqslant 1$	4
$0 < w \leqslant 2$	19
$0 < w \leqslant 3$	39
$0 < w \leqslant 4$	50
$0 < w \leqslant 5$	56
$0 < w \leqslant 6$	60

(1)

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

(2)



(c) Use your graph to find an estimate for the median weight of the 60 parcels.

2.6 kilograms

(1)

(d) Use your graph to find an estimate for the number of these parcels that weigh more than 3.7 kilograms.

60 − 46 = 14

(2)

Question 12

The table gives information about the distances, in km, that 70 teachers travel to school.

Distance (d km)	Frequency	
$0 < d \leqslant 10$	7	7
$10 < d \leqslant 20$	17	24
$20 < d \leqslant 30$	18	42
$30 < d \leqslant 40$	14	56
$40 < d \leqslant 50$	10	66
$50 < d \leqslant 60$	4	70

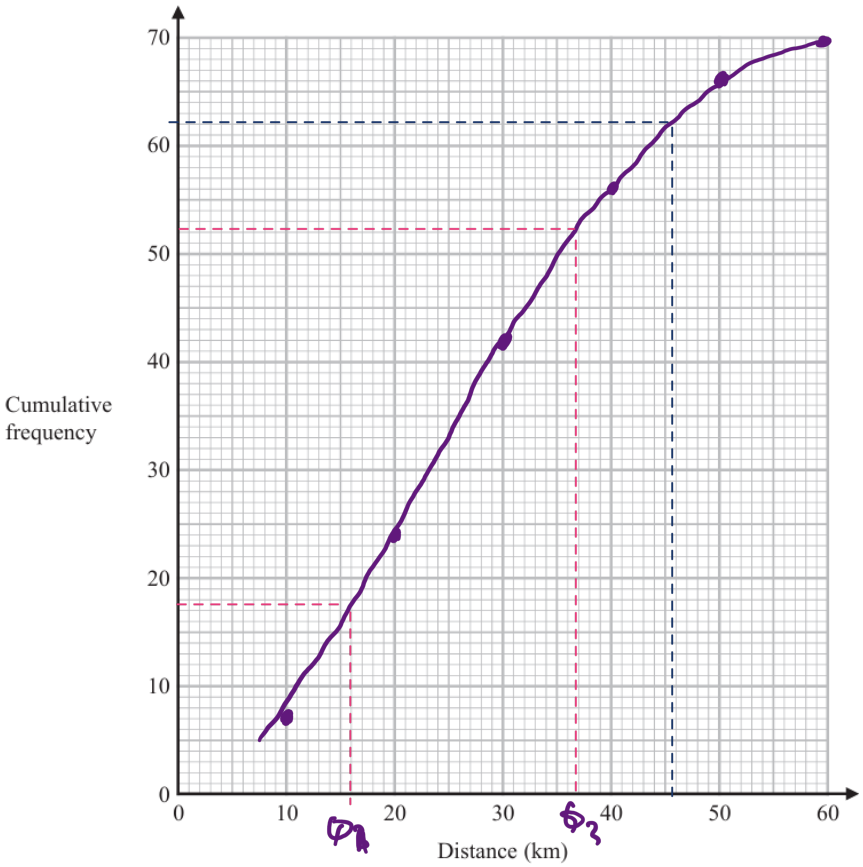
(a) Complete the cumulative frequency table.

Distance (d km)	Cumulative frequency
$0 < d \leqslant 10$	7
$0 < d \leqslant 20$	24
$0 < d \leqslant 30$	42
$0 < d \leqslant 40$	56
$0 < d \leqslant 50$	66
$0 < d \leqslant 60$	70

(1)

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

(2)



upper Quartile (Q_3)

$\frac{3}{4}$ x Cumulative

lower Quartile

$\frac{1}{4}$ x Cumulative

(c) Use your graph to find an estimate for the interquartile range of the distances.

37 - 16

21 km

(2)

(d) Use your graph to find an estimate for the number of teachers who travel more than 46 km.

(Go to 46 on horizontal axis and up, then across)

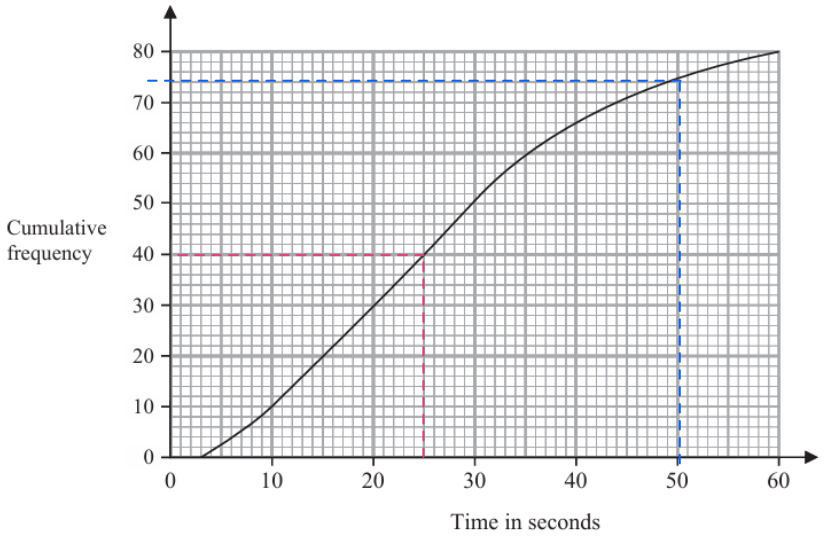
70 - 62

8 teacher

(2)

Question 13

The cumulative frequency graph gives information about the times, in seconds, that 80 adults took to log in to an online bank.



(a) Find an estimate for the median time.

25 seconds

(1)

(b) Work out the percentage of these adults that took longer than 50 seconds to log in.
Show your working clearly.

80 - 74 = 6 / 80 x 100 = 7.5 %

(3)

Question 14

$Q_1 = \frac{1}{4}(n+1)^{th} = 3^{rd}$

$Q_3 = \frac{3}{4}(n+1)^{th} = 9^{th}$

Robert asked 11 people how many meetings they attended last week.

Here are the results in numerical order.

1 2 4 6 6 8 11 12 13 14 17

Find the interquartile range of the number of meetings.

13 - 4 = 9

(2)

Question 15

$Q_1 = 4^{th} = 15$

$Q_3 = 12^{th} = 25$

Here are the test marks of 15 students.

7 10 14 15 16 17 18 19 20 20 23 25 30 39 40

Find the interquartile range of these marks.

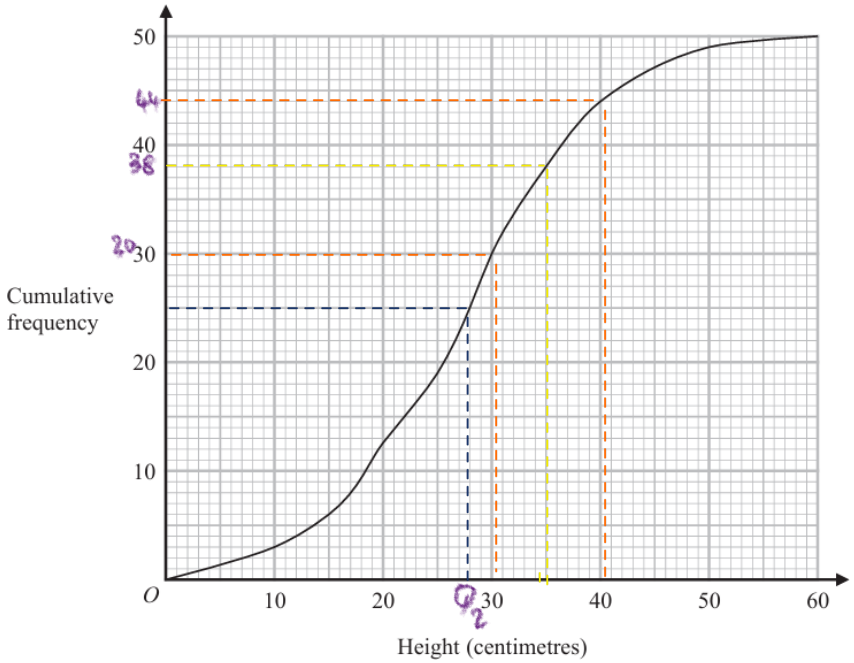
25 - 15

10

(2)

Question 16

The cumulative frequency graph shows information about the heights, in centimetres, of 50 plants in a flowerbed.



(a) Use the graph to find an estimate for the median height of these plants.

(a) Use the graph to find an estimate for the median height of these plants.

(black broken line) 28cm

..... centimetres

(1)

(b) Use the graph to find the frequency for the class interval $30 < \text{Height} \leqslant 40$

44 − 30

(orange broken lines) 14

(1)

(c) Use the graph to find an estimate for the number of plants with a height greater than 35 centimetres.

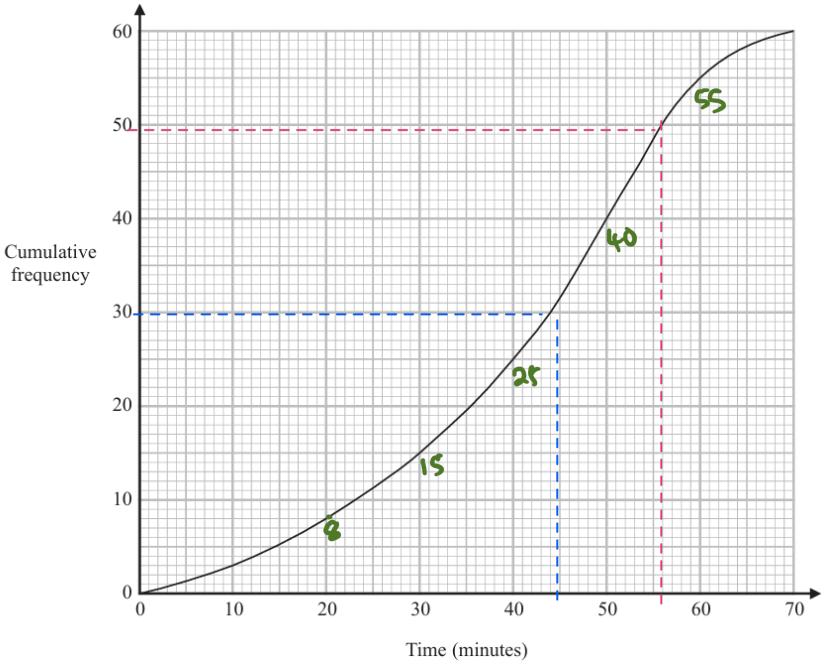
50 − 38

(yellow broken line) 12

(2)

Question 17

The cumulative frequency graph gives information about the time, in minutes, each of 60 people took to shop in a market.



(a) Use the graph to find an estimate for the median time people took to shop in the market.

45 minutes

(1)

(b) Use the graph to find an estimate for the number of people who took longer than 55 minutes to shop in the market.

60 − 50

10 people

(2)

(c) Use the graph to complete the frequency table to give information about the time, in minutes, each of the 60 people took to shop in the market.

Time taken to shop in the market (m minutes)	**Frequency**
$0 < m \leqslant 10$	3
$10 < m \leqslant 20$	5
$20 < m \leqslant 30$	7
$30 < m \leqslant 40$	10
$40 < m \leqslant 50$	15
$50 < m \leqslant 60$	15
$60 < m \leqslant 70$	5

(2)

Question 18

The table gives information about the amounts of money, in euros, that 70 of Anjali's friends spent last Saturday.

Money spent (S euros)	Frequency
$0 < S \leqslant 8$	6
$8 < S \leqslant 16$	14
$16 < S \leqslant 24$	19
$24 < S \leqslant 32$	25
$32 < S \leqslant 40$	6

4
12
20
28
36

24
168
380
700
216
1488

One of Anjali's 70 friends is going to be chosen at random.

(a) Find the probability that this friend spent more than 24 euros last Saturday.

31/70

.....

(1)

(b) Work out an estimate for the mean amount of money spent by Anjali's friends last Saturday.
Give your answer correct to 2 decimal places.

estimate of mean = 1488 ÷ 70
= 21.26 euros

..... euros

(4)