1. The cumulative frequency graph shows some information about the heights, in cm, of 60 students.
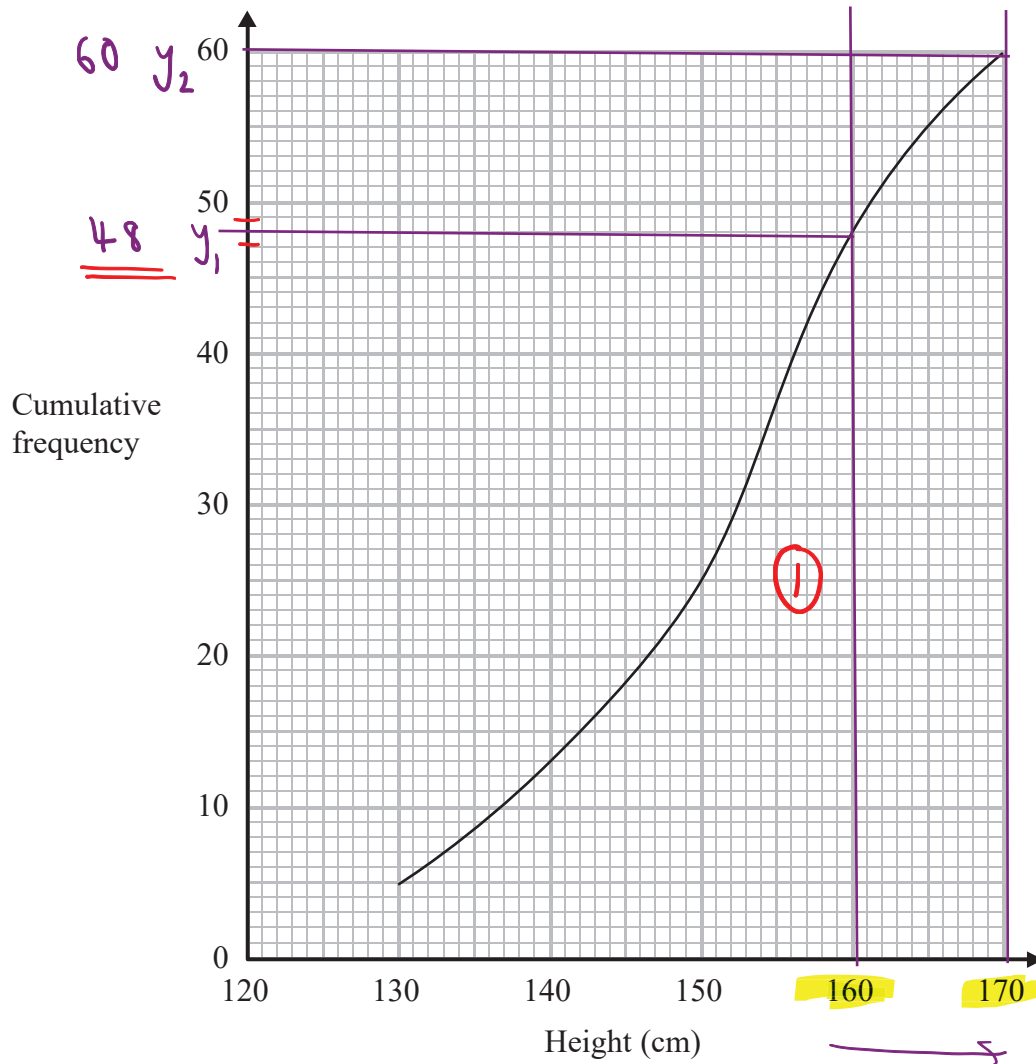
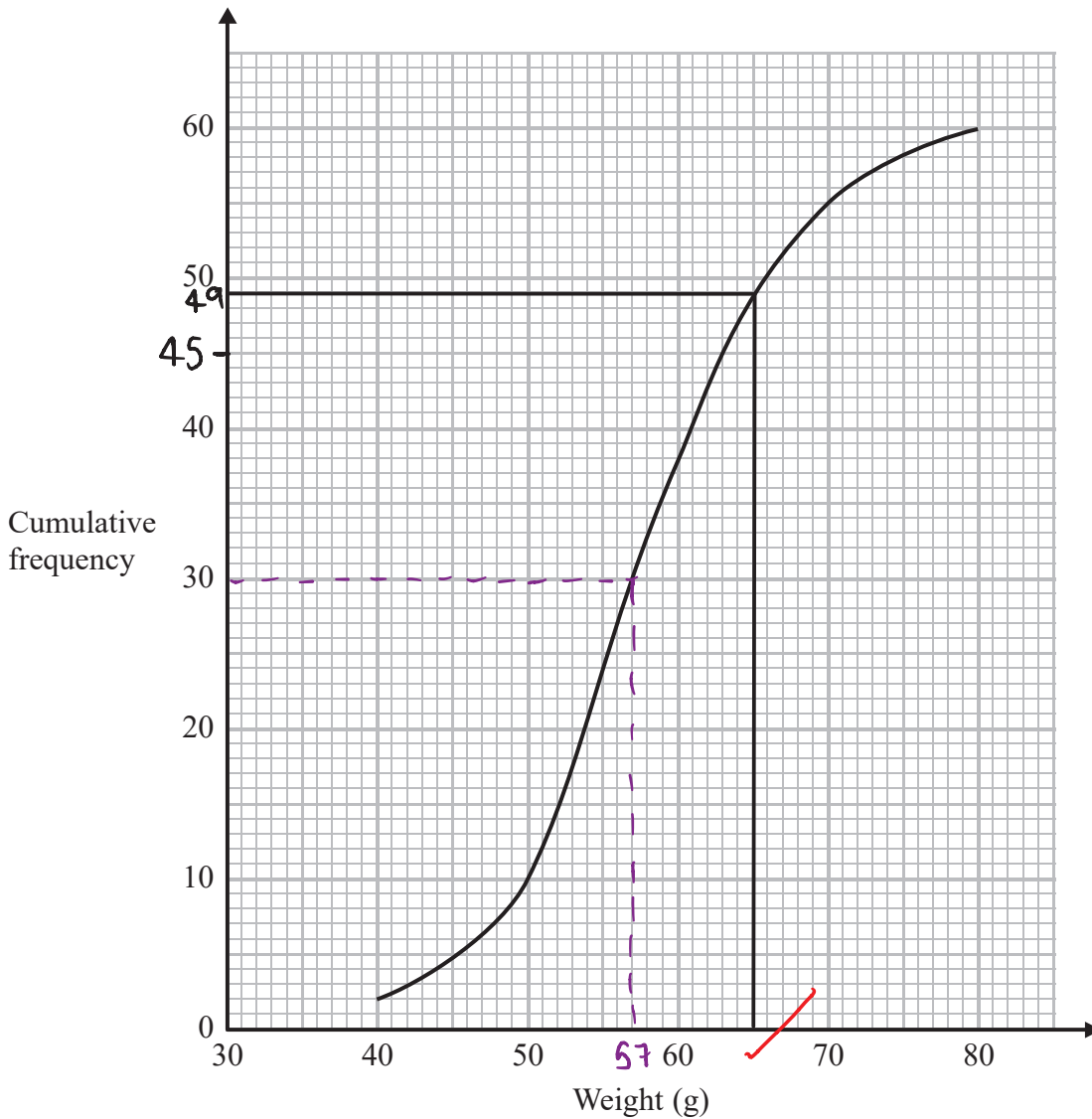

Work out an estimate for the number of these students with a height greater than 160 cm.

$$60 - 48 = 12.$$

12

....

(Total for Question   is 2 marks)

2. The cumulative frequency graph shows information about the weights of 60 potatoes.

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

.... 57 ✓ .... g

(1)

Jamil says,

"80 − 40 = 40 so the range of the weights is 40 g."

(b) Is Jamil correct?
You must give a reason for your answer.

No, Jamil may not be correct be correct because we don't know whether the highest weight is 80g or less than 80g ✓

(1)

(c) Show that less than 25% of the potatoes have a weight greater than 65 g.

25% of the potatoes is 15, however only 12 have a weight greater than 65g ✓

(2)

(Total for Question   is 4 marks)

3. The times that 48 trains left a station on Monday were recorded.

    The cumulative frequency graph gives information about the numbers of minutes the
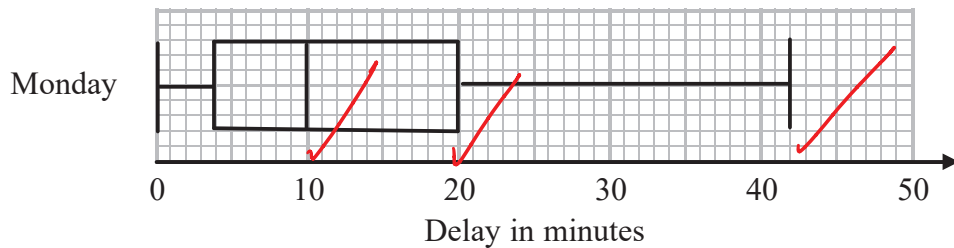   trains were delayed, correct to the nearest minute.

Lowest → 0
LQ → 4
Median → 10
UQ → 20
Highest → 42

Cumulative
frequency

50
40
36
30
24
20
12
10
0

0   4   10   20   30   40   50

Delay in minutes
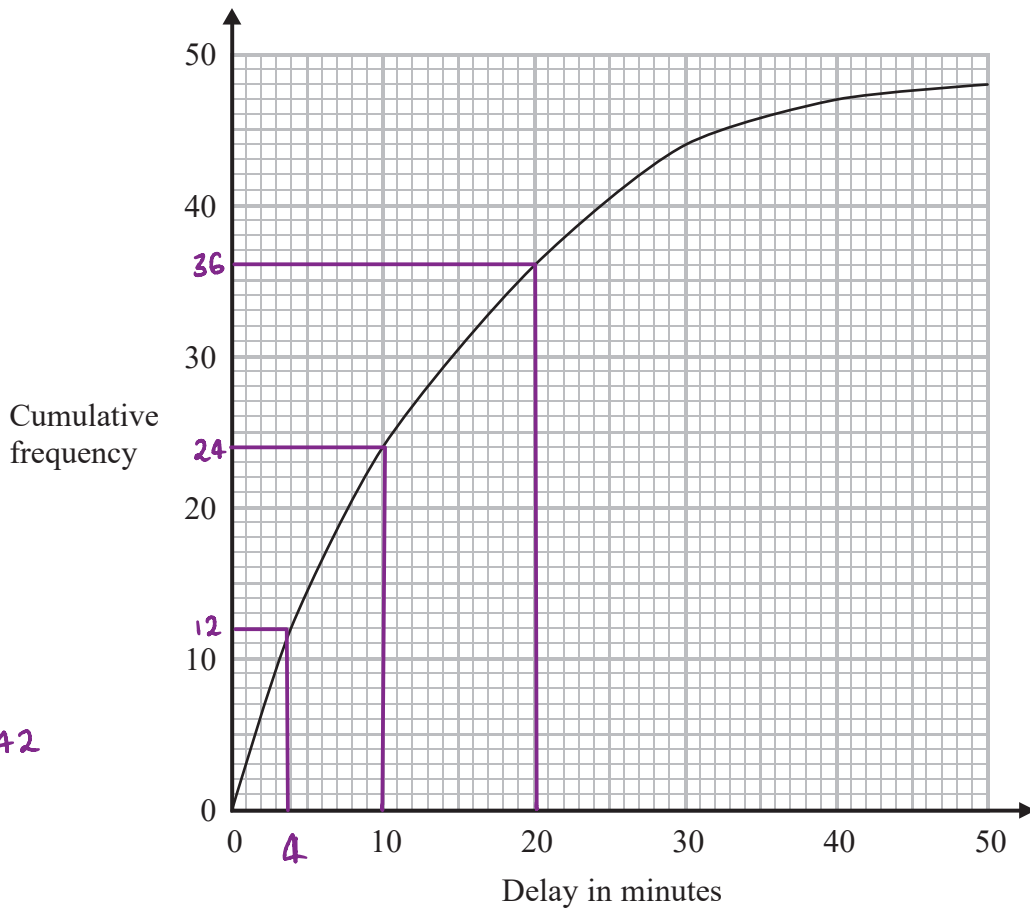
The shortest delay was 0 minutes.
The longest delay was 42 minutes.

(a) On the grid below, draw a box plot for the information about the delays on Monday.

Monday

0   10   20   30   40   50

Delay in minutes

(3)

48 trains left the station on Tuesday.
The box plot below gives information about the delays on Tuesday.

Tuesday

0   10   20   30   40   50

Delay in minutes
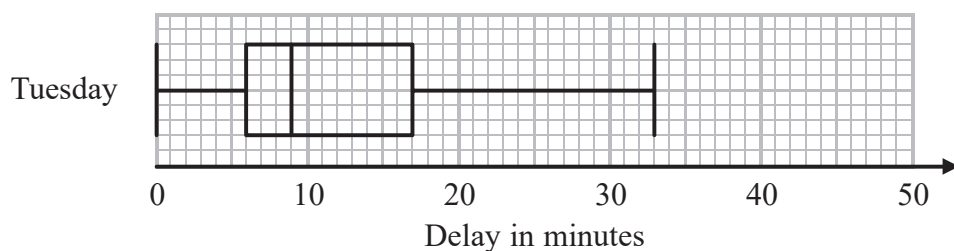
(b) Compare the distribution of the delays on Monday with the distribution of the delays on Tuesday.

· Median
· Measure of spread

The median on Monday is greater than on Tuesday ✓

The range on Monday is greater than on Tuesday ✓

(2)

Mary says,

"The longest delay on Tuesday was 33 minutes.
This means that there must be some delays of between 25 minutes and 30 minutes."

(c) Is Mary right?
You must give a reason for your answer.

No, because the upper 25% of trains may be delayed between 17 and 25 mins

or 30 and 35 mins ✓

(1)

$$\frac{x-1}{5(x-1)^2} \div \frac{(x-1)}{(x-1)} = \frac{1}{5(x-1)}$$

$$\frac{1}{5(x-1)} ✓$$

$$2(25 - 4^2) ✓$$

$$2(5-4)(5+4)$$

$$2(5-4)(5+4) ✓$$

4. The grouped frequency table gives information about the times, in minutes, that 80 office workers take to get to work.

Time (*t* minutes)	Frequency
$0 < t \leqslant 20$	5
$20 < t \leqslant 40$	30
$40 < t \leqslant 60$	20
$60 < t \leqslant 80$	15
$80 < t \leqslant 100$	8
$100 < t \leqslant 120$	2

(a) Complete the cumulative frequency table.

Time (*t* minutes)	Cumulative frequency
$0 < t \leqslant 20$	5
$0 < t \leqslant 40$	35
$0 < t \leqslant 60$	55
$0 < t \leqslant 80$	70
$0 < t \leqslant 100$	78
$0 < t \leqslant 120$	80

①

(1)

(b) On the grid, draw the cumulative frequency graph for this information.
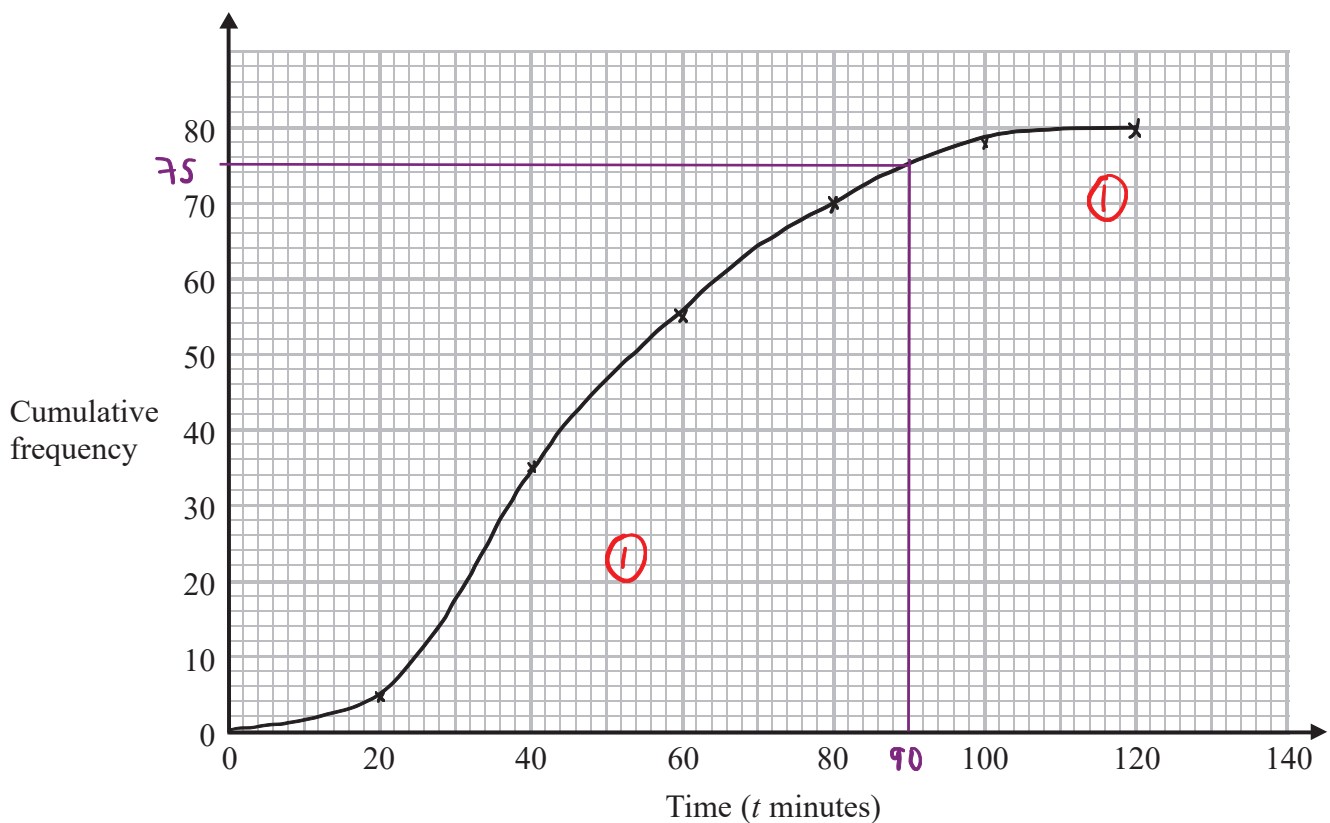
(2)

(c) Use your graph to find an estimate for the percentage of these office workers who take more than 90 minutes to get to work.

Number of people who take less than 90 mins = 75   ①

∴ Number of people who take more than 90 mins = 80-75 = 5

% of people who take more than 90 mins

= $\frac{5}{80}$ × 100 = 6·25%   ①

①

6·25 .... %

(3)

(Total for Question   is 6 marks)

* Since this question involves reading from a graph, there is a range of acceptable answers for the no. of people who take < 90 mins. Mark scheme accepts 72-76.

5. The cumulative frequency table shows information about the times, in minutes, taken by 40 people to complete a puzzle.

Time (m minutes)	Cumulative frequency
$20 < m \leqslant 40$	5
$20 < m \leqslant 60$	25
$20 < m \leqslant 80$	35
$20 < m \leqslant 100$	38
$20 < m \leqslant 120$	40

(40, 5)
(60, 25)
(80, 35)
(100, 38)
(120, 40)

(a) On the grid below, draw a cumulative frequency graph for this information.

(2)

get these values from graph
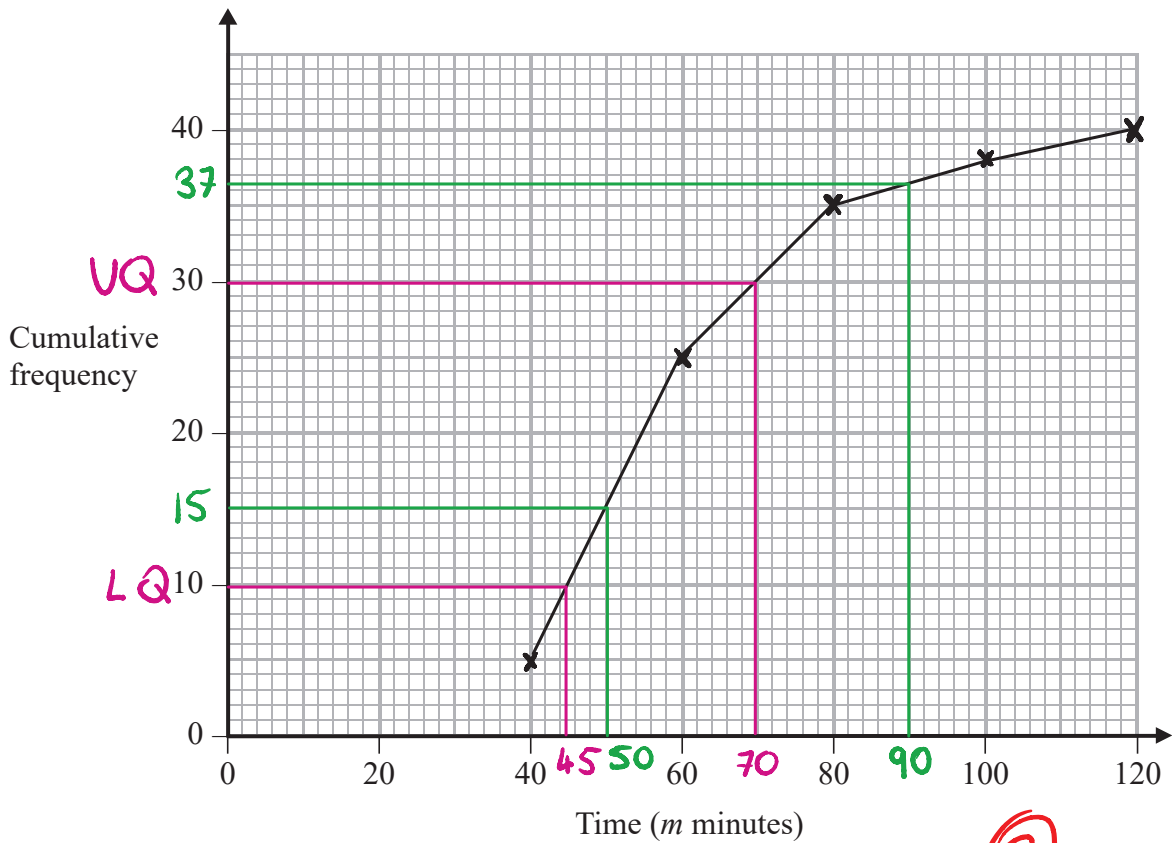
(b) Use your graph to find an estimate for the interquartile range.

$IQR = UQ - LQ$

$\times \frac{3}{4}$ $\times \frac{1}{4}$

① For UQ: $40 \times \frac{3}{4} = 30 \rightarrow 70$ mins

For LQ: $40 \times \frac{1}{4} = 10 \rightarrow 45$ mins

$\therefore IQR = 70 - 45 = 25$ ① ......25...... minutes

(2)

One of the 40 people is chosen at random.

(c) Use your graph to find an estimate for the probability that this person took between 50 minutes and 90 minutes to complete the puzzle.

get these values from graph

$37 - 15 = 22$
①

Over 40 since 40 people in total

$\dfrac{22}{40}$ ①

(2)

6. The table gives information about the weekly wages of 80 people.

Wage (£w)	Frequency
$200 < w \leqslant 250$	5
$250 < w \leqslant 300$	10
$300 < w \leqslant 350$	20
$350 < w \leqslant 400$	20
$400 < w \leqslant 450$	15
$450 < w \leqslant 500$	10

(a) Complete the cumulative frequency table.

Wage (£w)	Cumulative frequency
$200 < w \leqslant 250$	5
$200 < w \leqslant 300$	15
$200 < w \leqslant 350$	35
$200 < w \leqslant 400$	55 ✓₁
$200 < w \leqslant 450$	70
$200 < w \leqslant 500$	80

(1)

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

↳ for grouped data, plot end point of group

(2)

Juan says

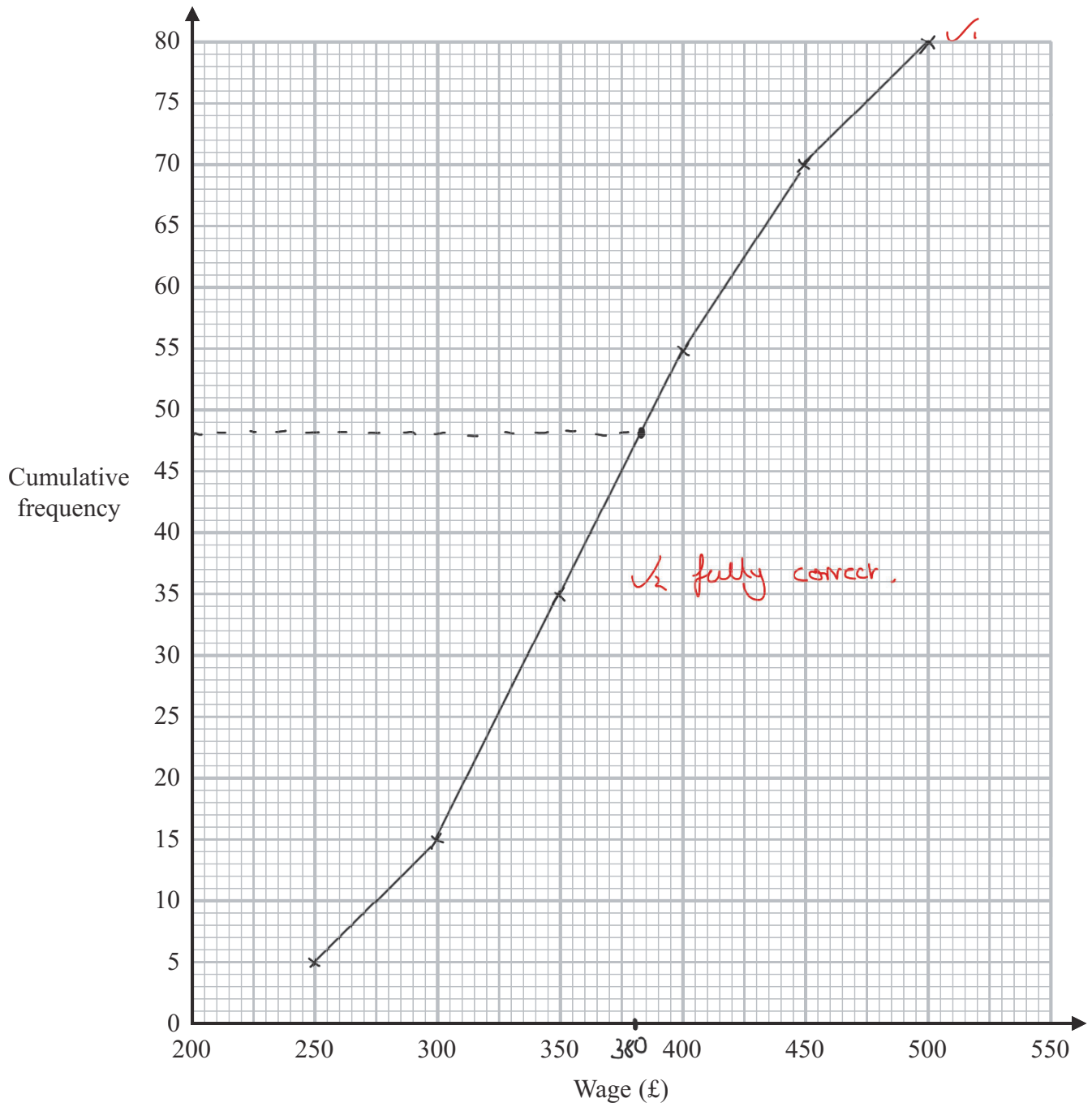"60% of this group of people have a weekly wage of £360 or less."

(c) Is Juan correct?
You must show how you get your answer.

60% of group = 60% of 80 people

= $\frac{60}{100}$ × 80 ppl

= $\frac{6\cancel{0} \times 8\cancel{0}}{1\cancel{0}\cancel{0}}$ = 48 ppl ✓₁

from graph, 60% make
£380. £380 > £360
∴ No, he is wrong. ✓₃

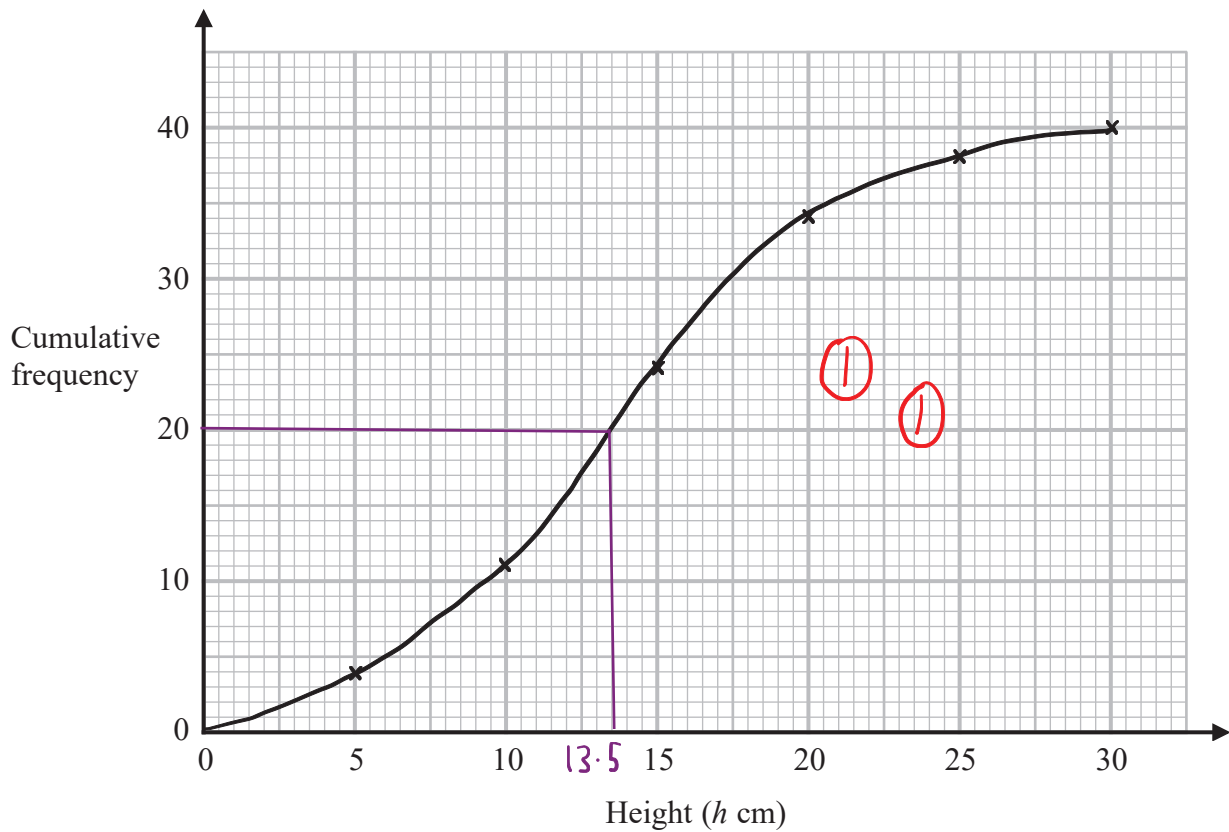**(3)**

Cumulative frequency

Wage (£)

(Total for Question   is 6 marks)

7.   The cumulative frequency table gives information about the heights, in cm, of 40 plants.

Height (*h* cm)	Cumulative Frequency
$0 < h \leqslant 5$	4
$0 < h \leqslant 10$	11
$0 < h \leqslant 15$	24
$0 < h \leqslant 20$	34
$0 < h \leqslant 25$	38
$0 < h \leqslant 30$	40

(a) On the grid, draw a cumulative frequency graph for this information.

(2)

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

13.5 cm

(1)

(Total for Question   is 3 marks)