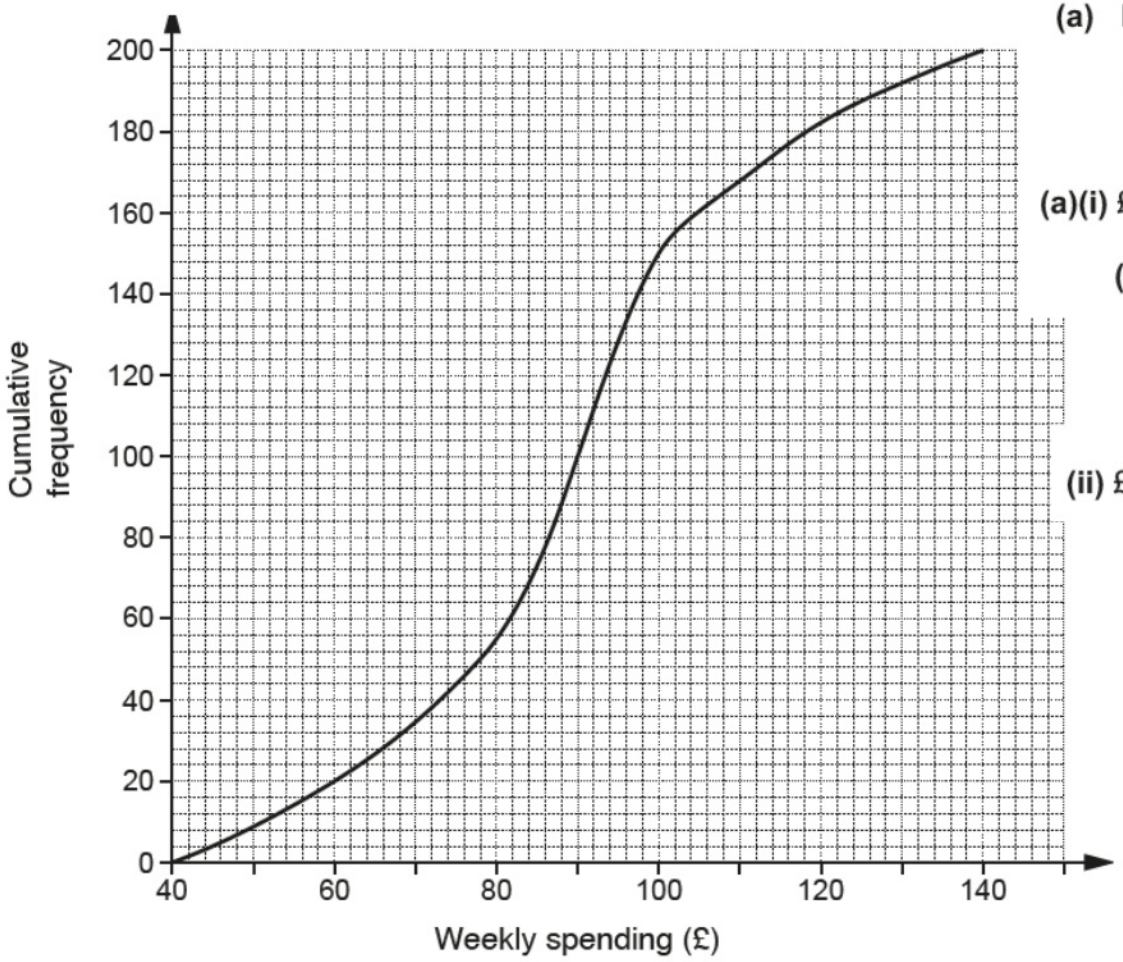
P35- Cumulative Frequency

OCR

15 Iqrah carries out a survey of 200 families in the **north** of England on their weekly spending on food.

P35 The cumulative frequency diagram summarises the results.



(a) Find

(i) the median,

(a)(i) £ ..... **[1]**

(ii) the interquartile range.

(ii) £ ..... **[2]**

Created by W Neill

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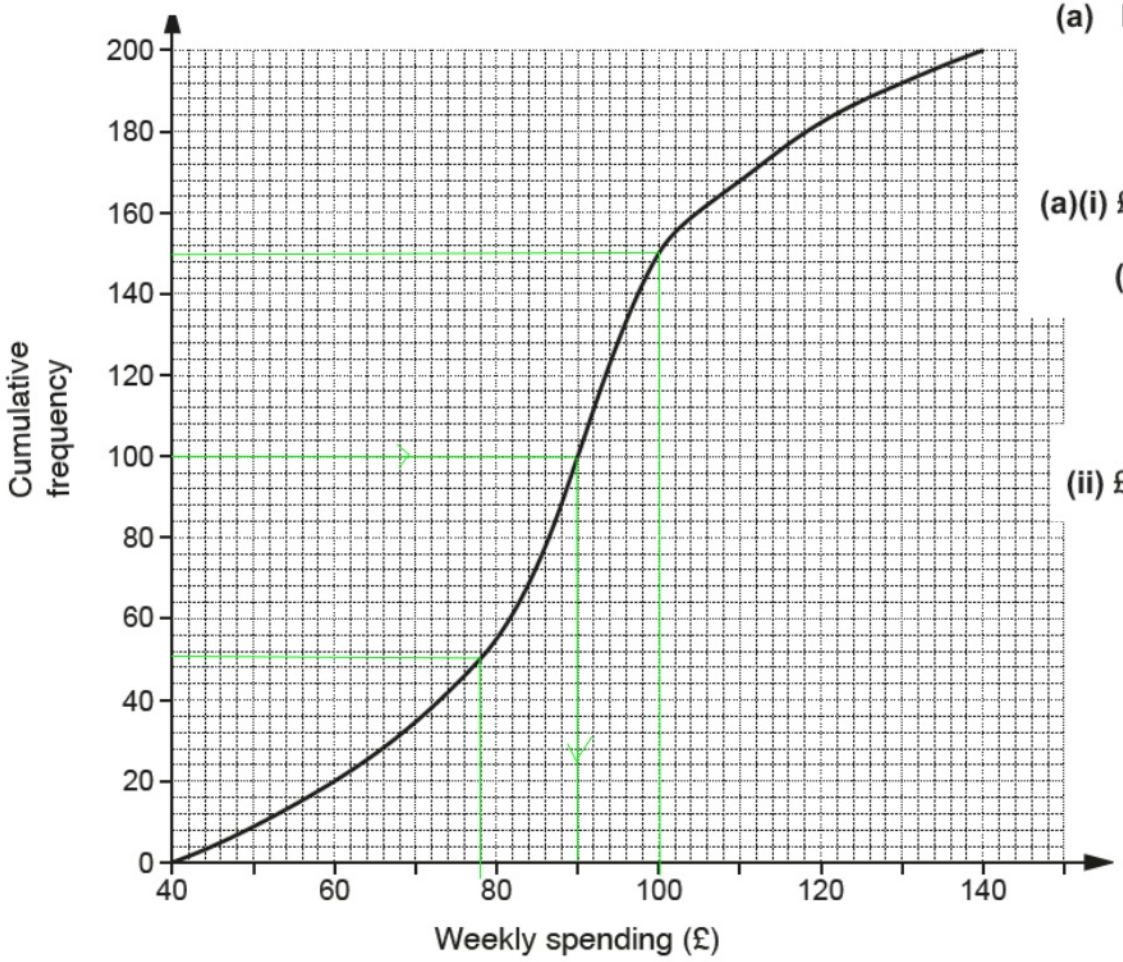


(a) Find

(i) the median,

£190

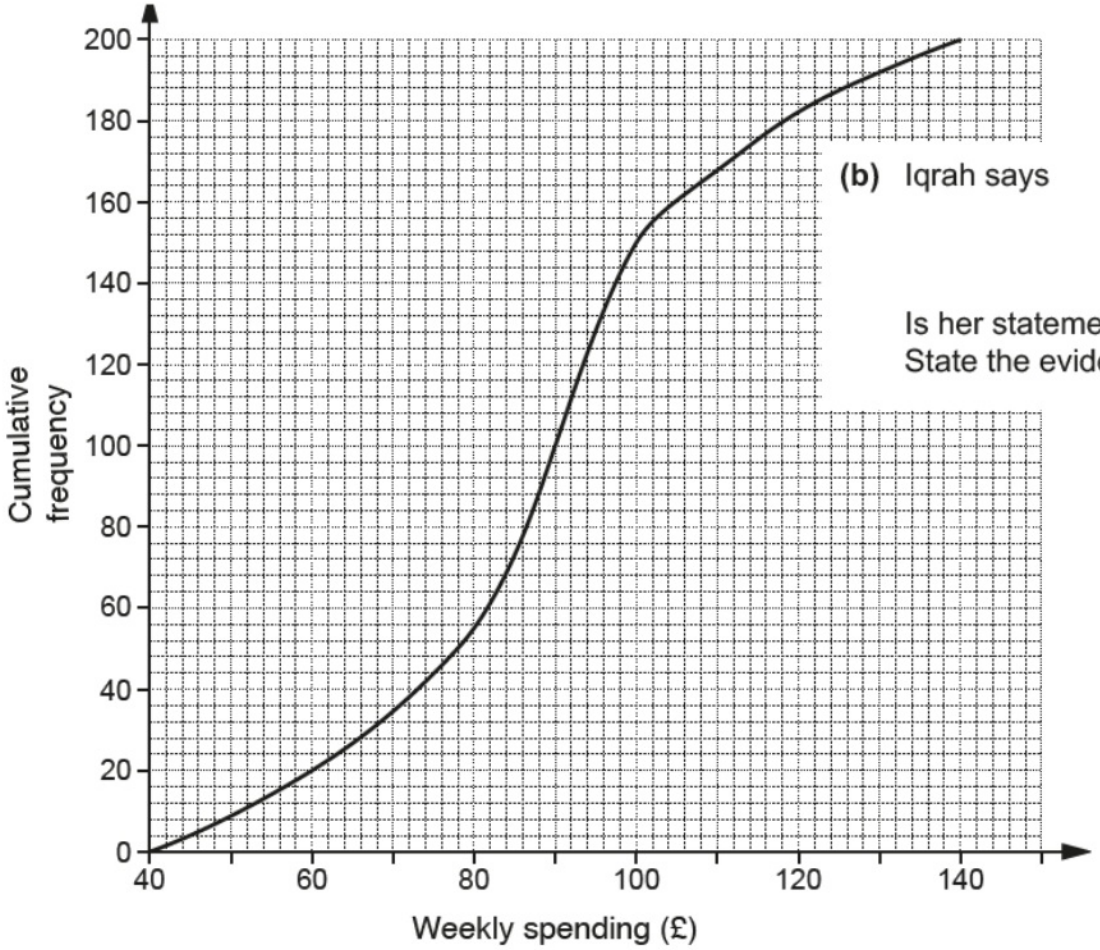
(a)(i) £ ..... **[1]**

(ii) the interquartile range.

UQ - LQ £100 - £78

£22

(ii) £ ..... **[2]**



(b) Iqrah says

15% of these families spent over £120.

Is her statement correct?
State the evidence you have used in making your decision.

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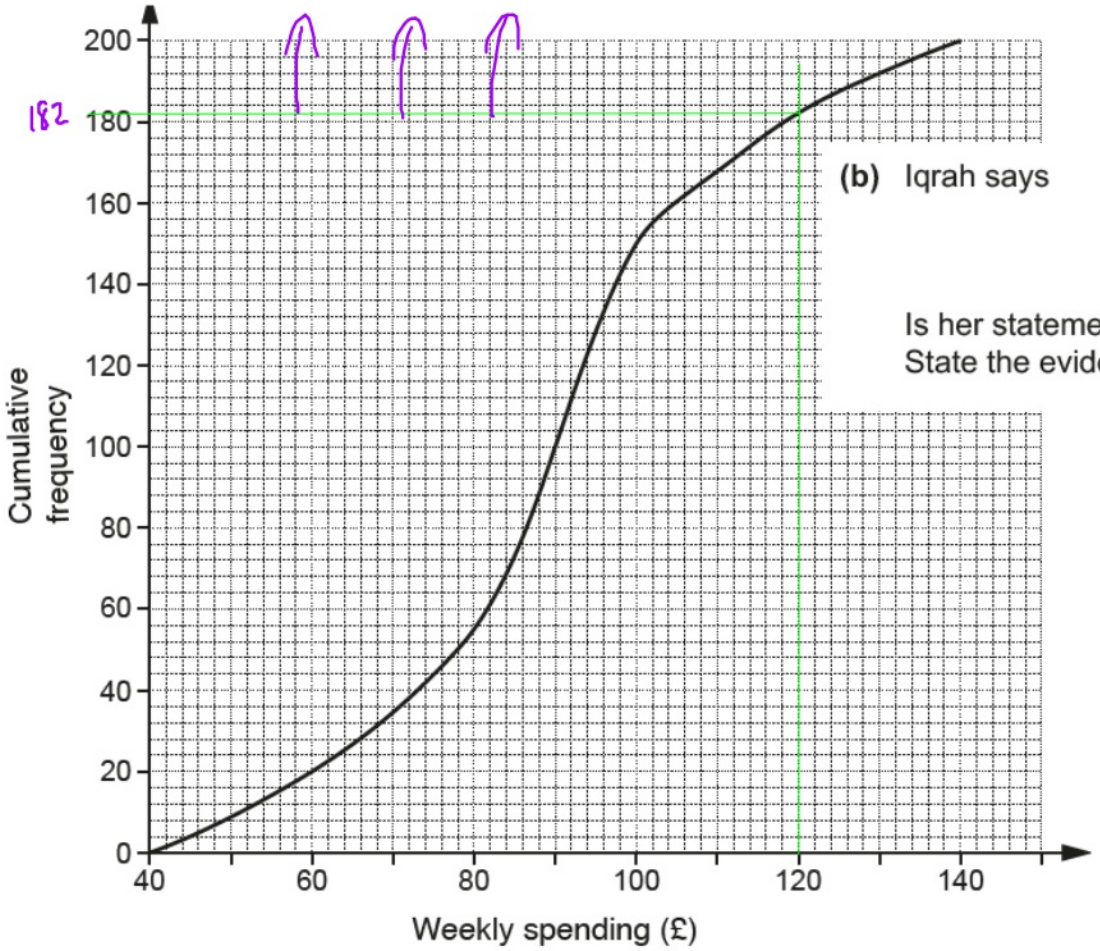


(b) Iqrah says

15% of these families spent over £120.

Is her statement correct?
State the evidence you have used in making your decision.

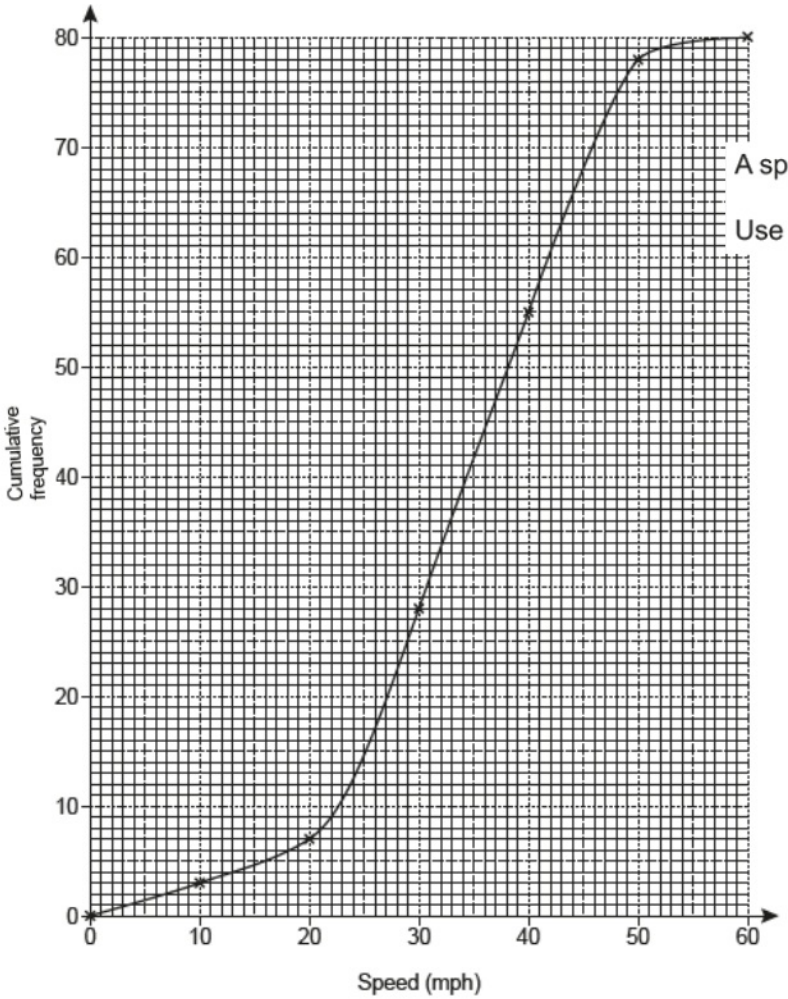
15% of 200 families

= 10% = 20
5% = 10
30 families

18 families on graph spent more than £120 so no, statement not correct.

12 The cumulative frequency graph shows the speeds, in miles per hour (mph), of vehicles passing a 40 mph speed limit sign on a road.

Video created by W Neill

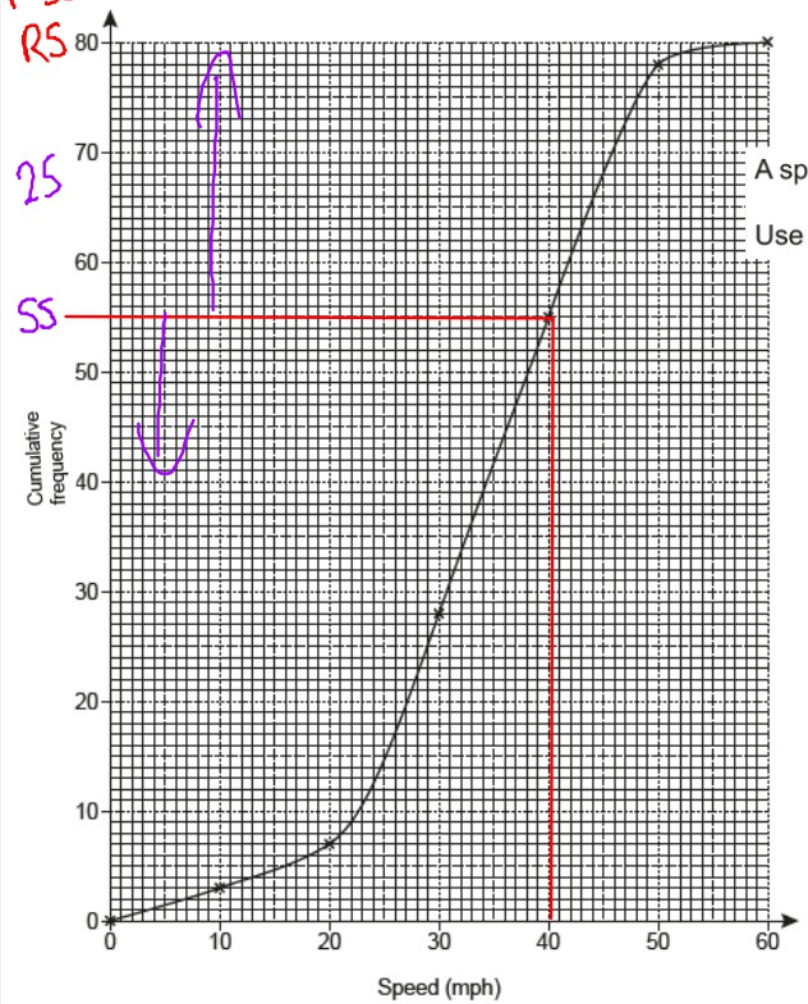


A speed camera will be installed if more than 30% of vehicles go over the speed limit of 40 mph.

Use information from the graph to decide if a speed camera should be installed. **[4]**

12 The cumulative frequency graph shows the speeds, in miles per hour (mph), of vehicles passing a 40 mph speed limit sign on a road.

Video created by W Neill



A speed camera will be installed if more than 30% of vehicles go over the speed limit of 40 mph.

Use information from the graph to decide if a speed camera should be installed. **[4]**

80 vehicles

25 vehicles went over 40mph

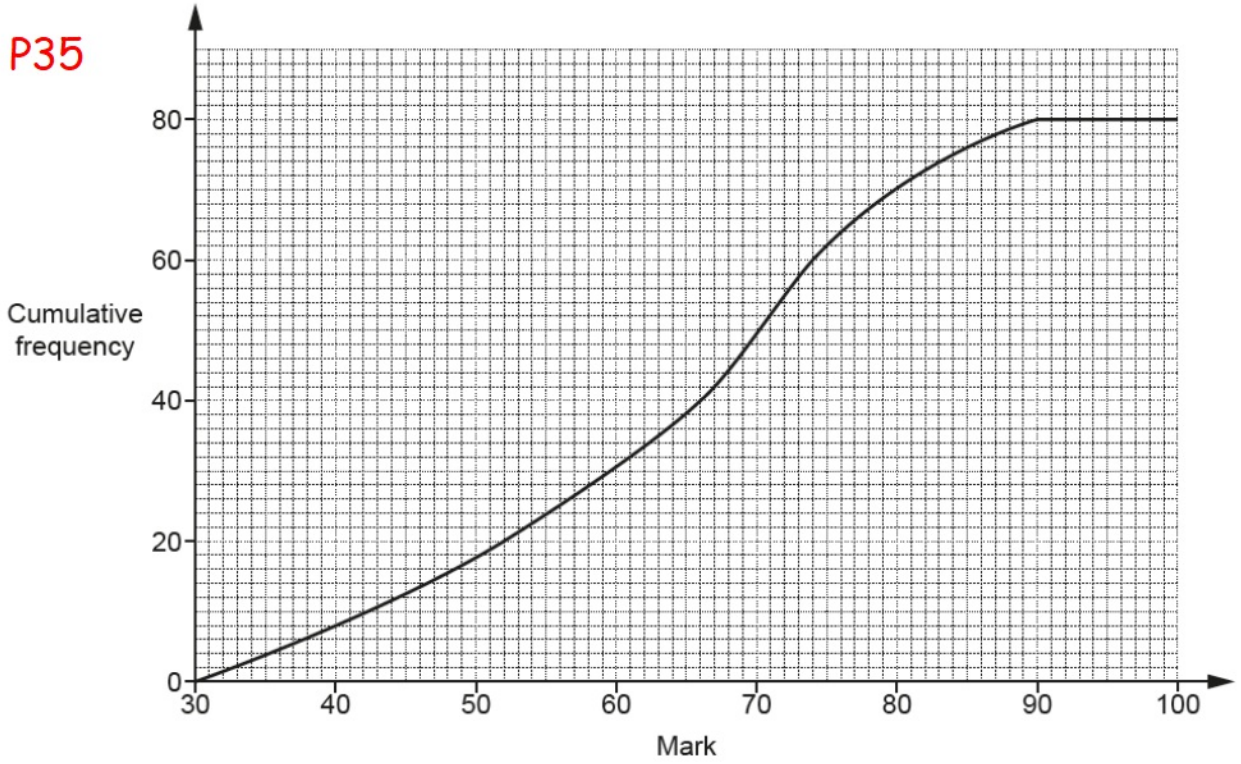
$\frac{25}{80} = 31.25\%$

Yes, install as $31.25\% > 30\%$

Video created by Will Neill

15 The cumulative frequency graph shows information about the marks scored by a group of 80 students in a test.

P35



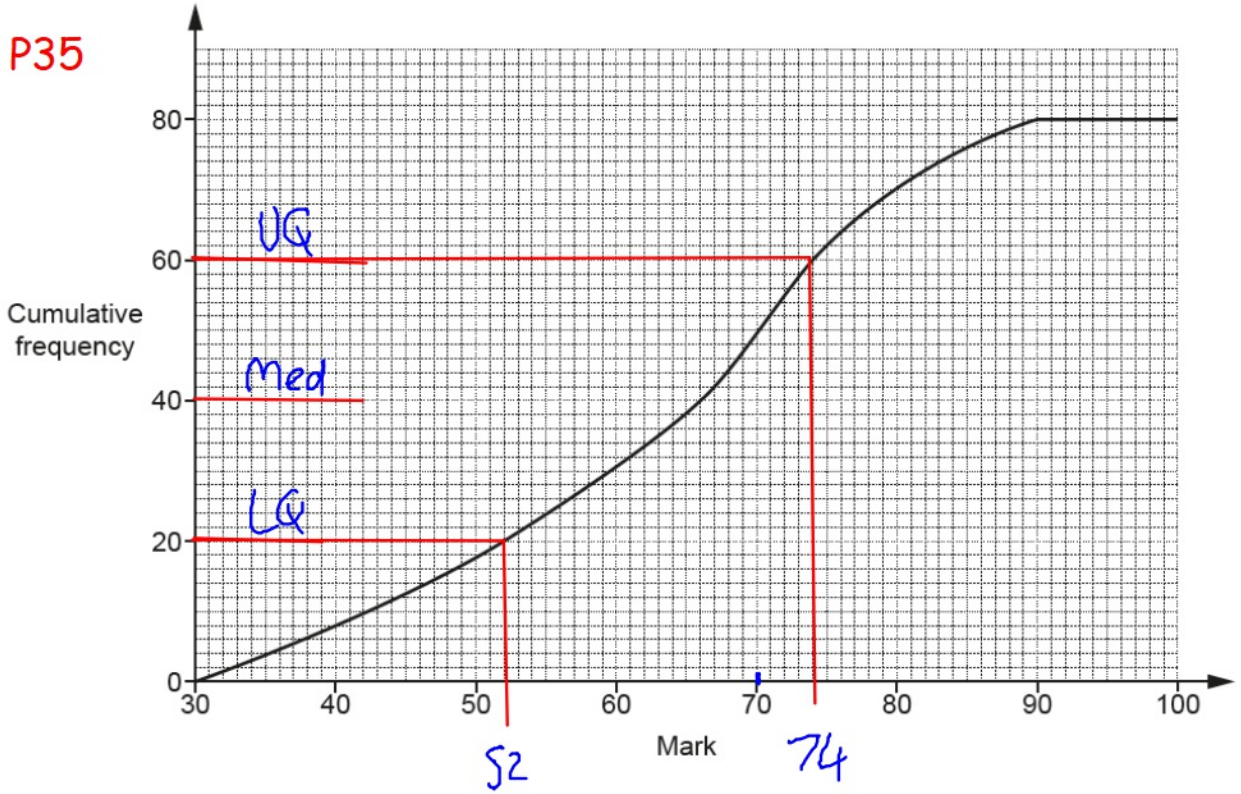
(a) Find the interquartile range.

(a) ..... **[2]**

Video created by Will Neill

15 The cumulative frequency graph shows information about the marks scored by a group of 80 students in a test.

P35



IQR

UQ - LQ

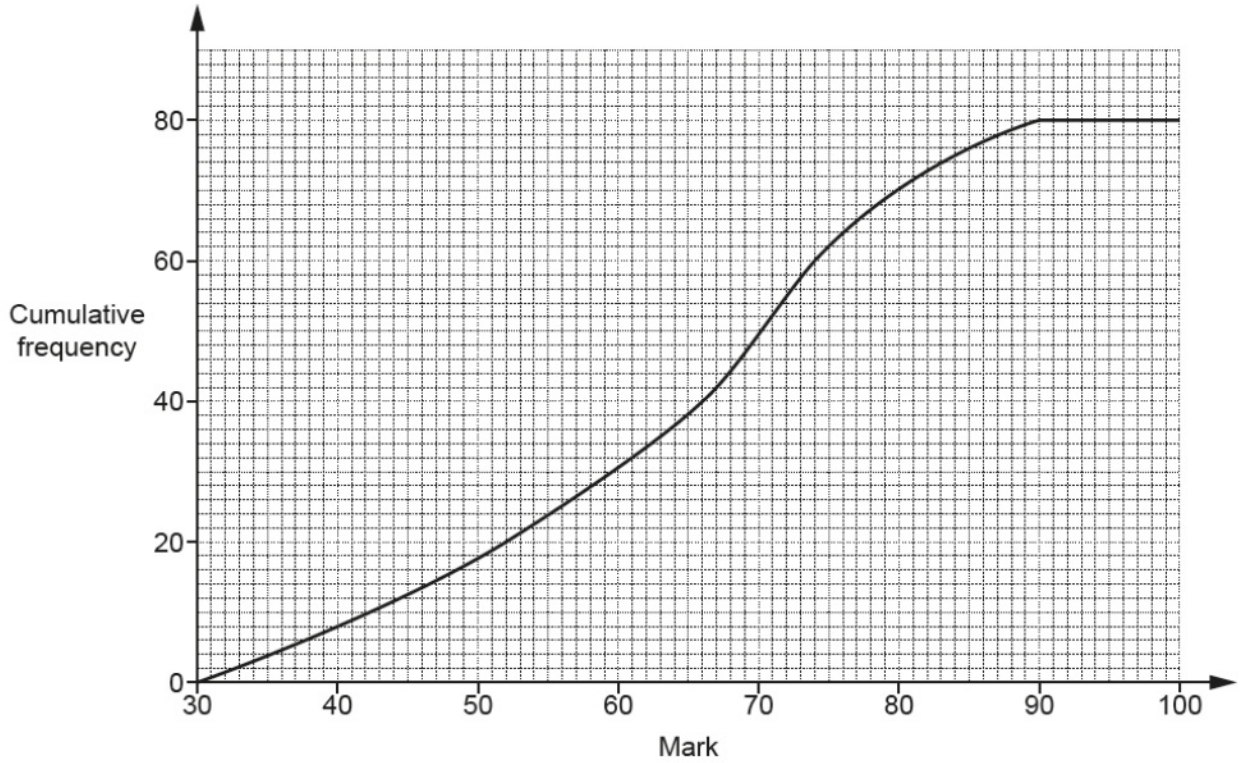
74 - 52

(a) Find the interquartile range.

(a) 22 ..... **[2]**

Video created by Will Neill

15 The cumulative frequency graph shows information about the marks scored by a group of 80 students in a test.

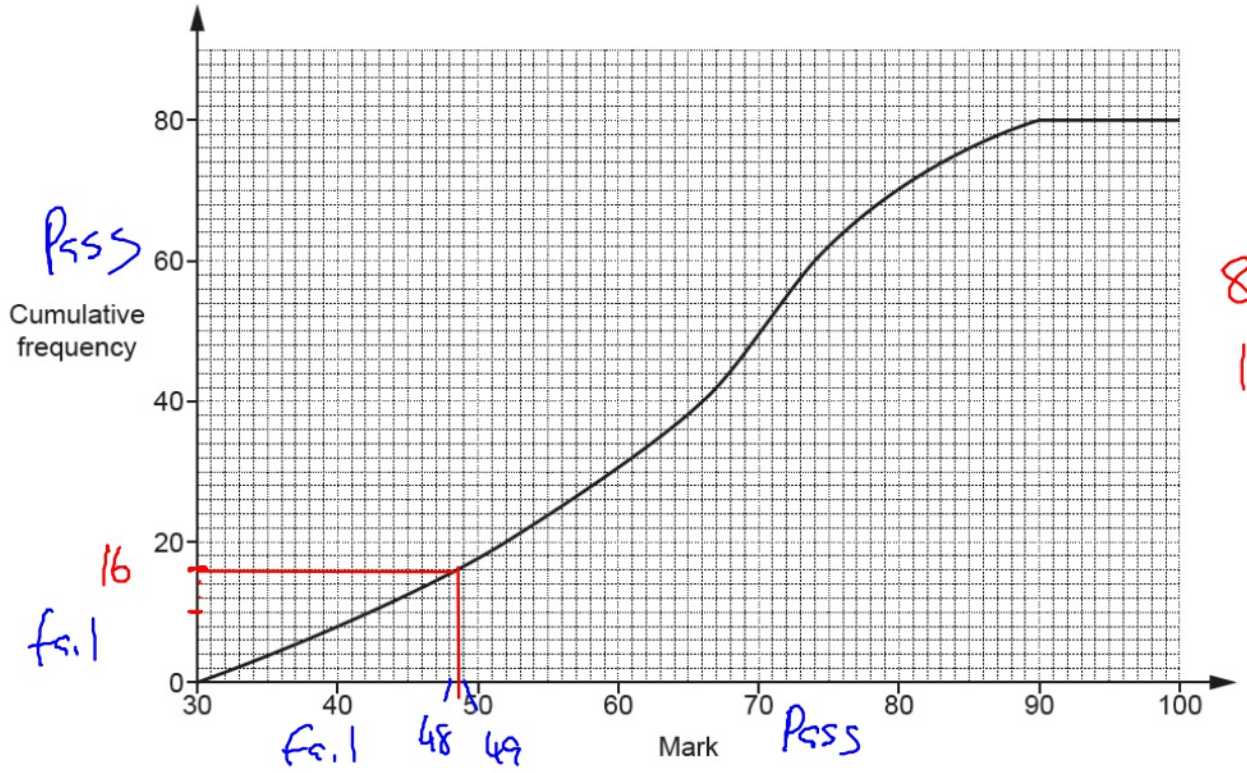


(b) The ratio of the number of students passing the test compared to failing the test is 4 : 1.
Find the minimum mark needed to pass the test.

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

Video created by Will Neill

15 The cumulative frequency graph shows information about the marks scored by a group of 80 students in a test.



80 Pass : fail
4 : 1

80 stud = 5 parts) ÷ 5
16 stud = 1 part

Pass Fail
4 : 1
64 : 16

48 - 49 ✓

(b) The ratio of the number of students passing the test compared to failing the test is 4 : 1.
Find the minimum mark needed to pass the test.

P35 / R15a

(b) 49 ✓ ..... **[3]**

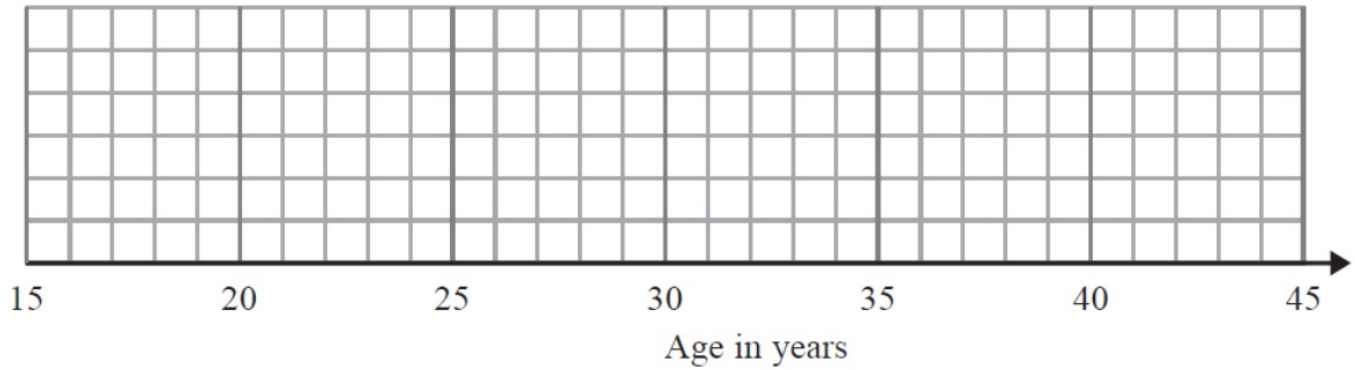
Edexcel

9 The stem and leaf diagram shows the ages, in years, of 25 people.

1	7	7	8	9							
2	1	2	4	4	5	5	6	7	8	9	9
3	0	1	2	2	3	4	5	6			
4	0	1									

Key: 1|7 represents 17 years

(a) (i) On the grid, draw a box plot for this information.



(3)

One of these people is chosen at random.

(ii) What is the probability that this person is 30 years of age or older?

.....

(2)

Created by W Neill

9 The stem and leaf diagram shows the ages, in years, of 25 people.

1	7 7 8 9
2	1 2 4 4 5 5 6 7 8 9 9
3	0 1 2 2 3 4 5 6
4	0 1

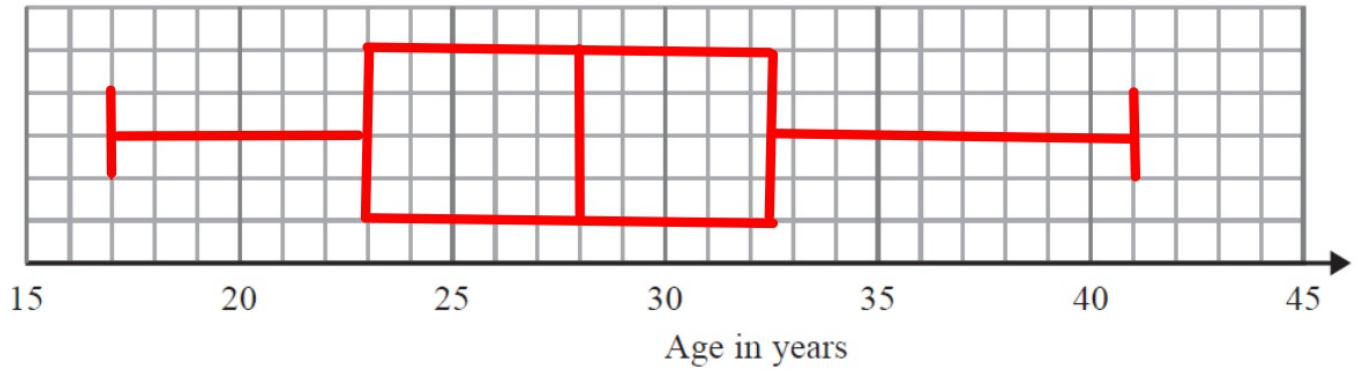
Key: 1|7 represents 17 years

Median $= \frac{1}{2}(25+1) = 13^{th} = 28$

LQ $= \frac{1}{4}(26) = 6.5^{th} = 23$

UQ $= \frac{3}{4}(26) = 19.5^{th} = 32.5$

(a) (i) On the grid, draw a box plot for this information.



(3)

One of these people is chosen at random.

(ii) What is the probability that this person is 30 years of age or older?

$\frac{10}{25}$

.....

(2)

The grouped frequency table gives information about the ages of a different group of people.

Age (a years)	Frequency
$0 < a \leqslant 20$	7
$20 < a \leqslant 30$	12
$30 < a \leqslant 40$	5
$40 < a \leqslant 50$	1

Anne drew this cumulative frequency table for this information.

Age (a years)	Cumulative frequency
$0 < a \leqslant 20$	7
$20 < a \leqslant 30$	19
$30 < a \leqslant 40$	24
$40 < a \leqslant 50$	25

The cumulative frequency table is **not** correct.

(b) Write down one thing that is wrong with the table.

.....

(1)

The grouped frequency table gives information about the ages of a different group of people.

Age (a years)	Frequency
$0 < a \leqslant 20$	7
$20 < a \leqslant 30$	12
$30 < a \leqslant 40$	5
$40 < a \leqslant 50$	1

19

Anne drew this cumulative frequency table for this information.

Age (a years)	Cumulative frequency
$0 < a \leqslant 20$	7
$20 < a \leqslant 30$	19 ✓
$30 < a \leqslant 40$	24
$40 < a \leqslant 50$	25

The cumulative frequency table is **not** correct.

(b) Write down one thing that is wrong with the table.

Incorrect class intervals. This should be $0 < a \leqslant 30$

(1)

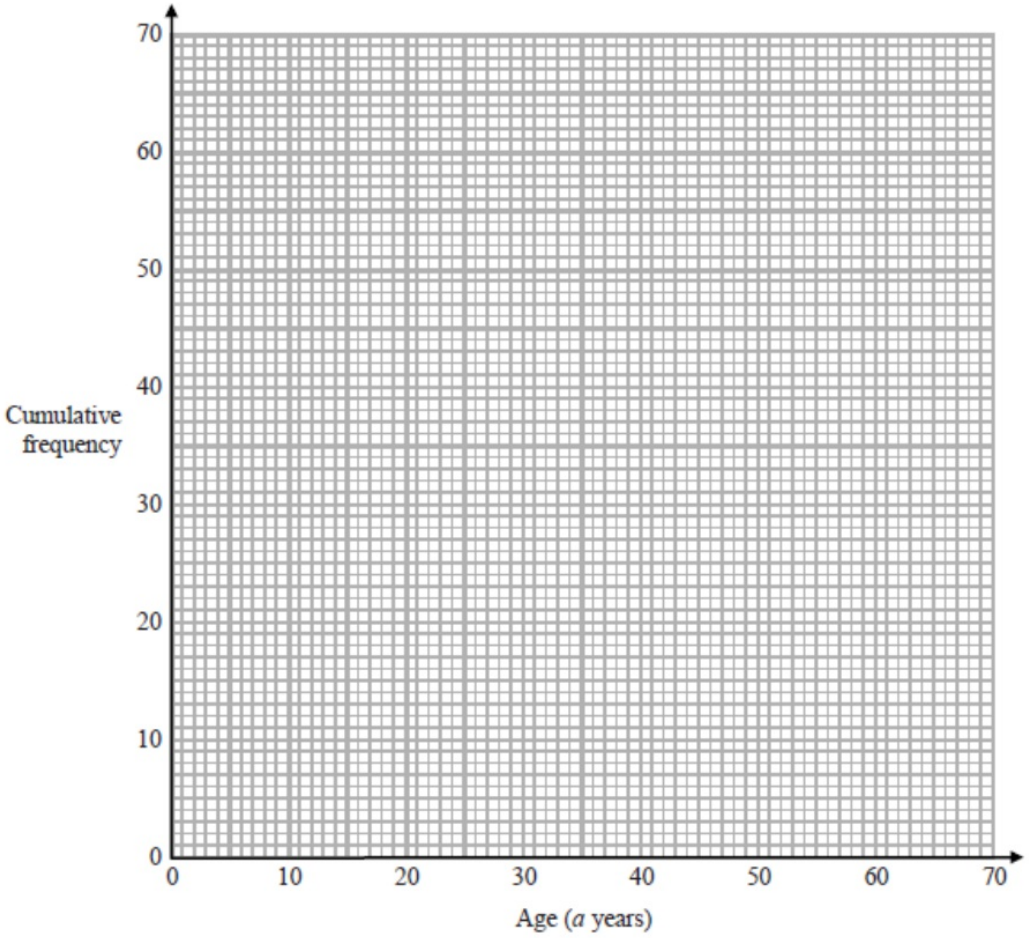
Created by W Neill

9 Francesco carried out a survey about the ages of the people in his office.

The table shows information about his results.

Age (a years)	Cumulative frequency
$20 < a \leqslant 30$	10
$20 < a \leqslant 40$	26
$20 < a \leqslant 50$	58
$20 < a \leqslant 60$	66
$20 < a \leqslant 70$	70

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



(2)

Created by W Neill

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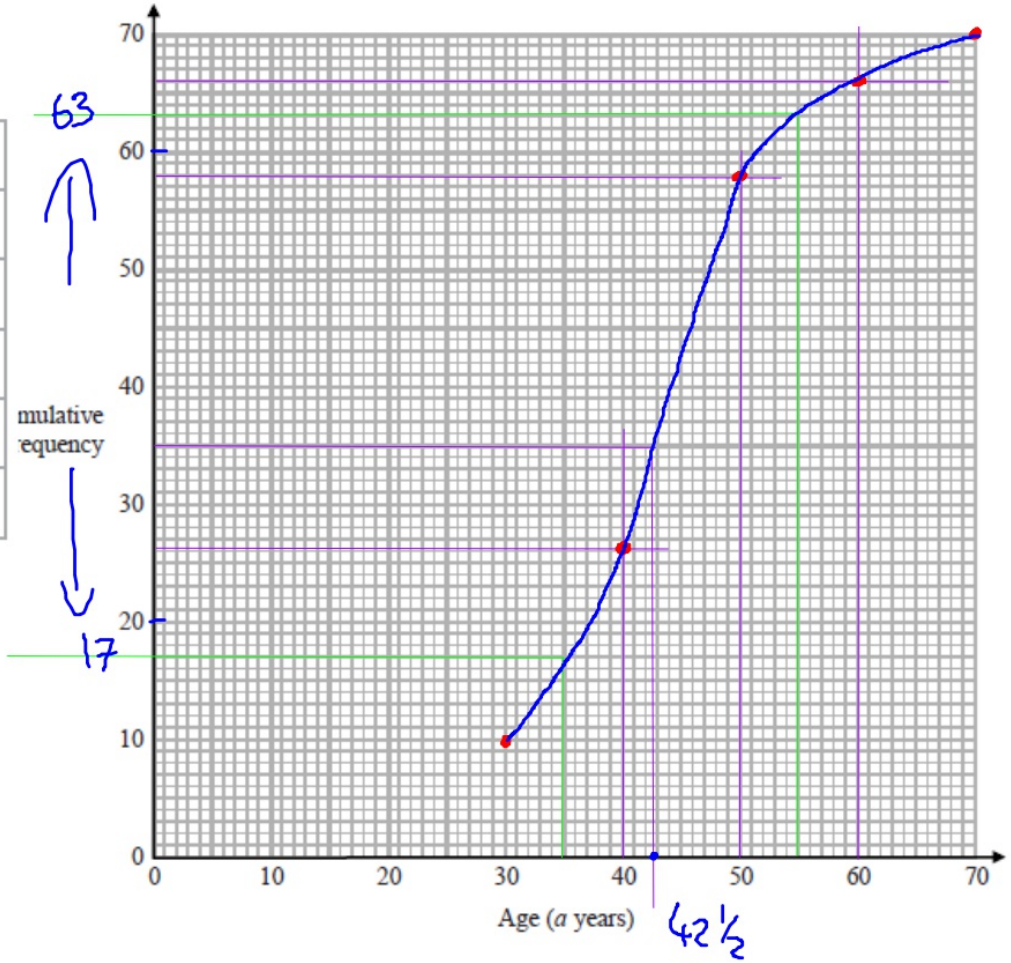
$20 < a \leqslant 30$	10
$20 < a \leqslant 40$	26
$20 < a \leqslant 50$	58
$20 < a \leqslant 60$	66
$20 < a \leqslant 70$	70

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

Median 70th 35th



(2)

(b) Use your graph to find an estimate for the median age.

.....years

(1)

Francesco says,

"More than 60% of the people in the office are between 35 and 55 years old."

(c) Use your graph to determine if Francesco is correct.

.....

(3)

(Total for Question 9 is 6 marks)

(b) Use your graph to find an estimate for the median age.

41 to 45 ✓

42½ ..... years

(1)

Francesco says,

"More than 60% of the people in the office are between 35 and 55 years old."

(c) Use your graph to determine if Francesco is correct.

70 people in total

63 - 17 are between 35 and 55

$\frac{46}{70} = 65.7\%$

Yes, this is more than 60%. ✓

(3)

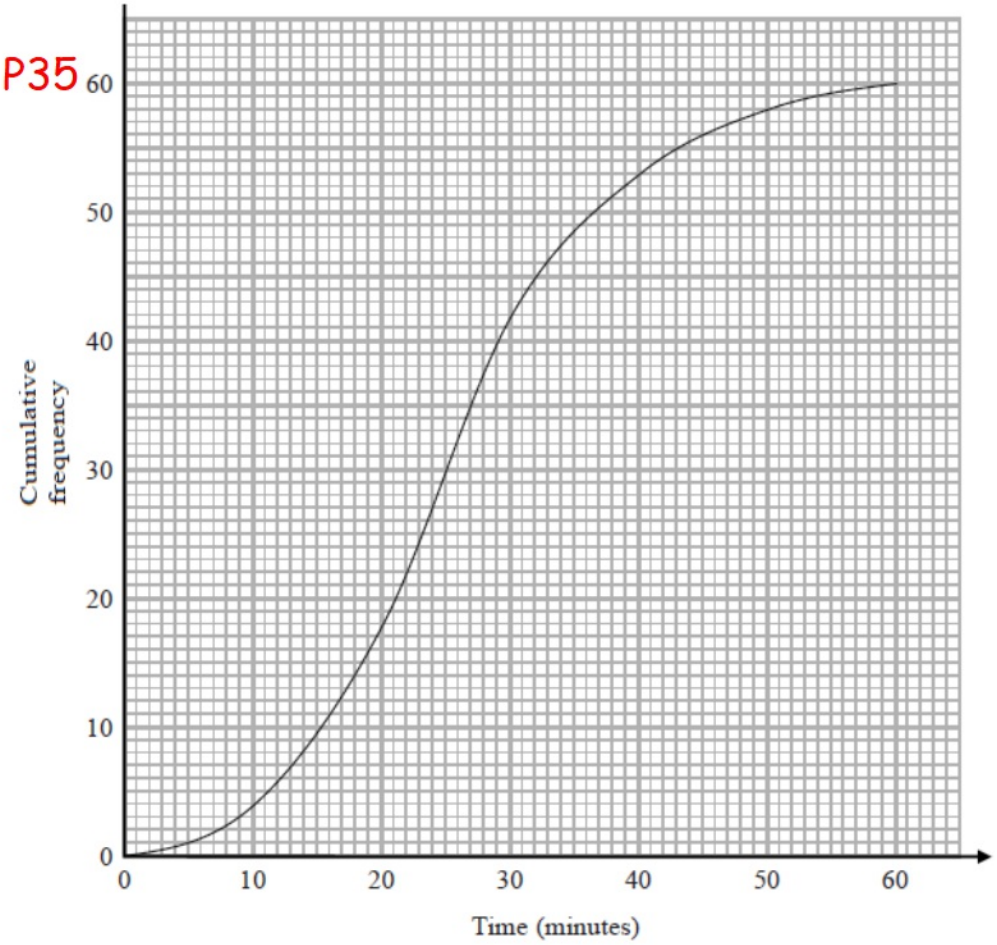
(Total for Question 9 is 6 marks)

Video created by W Neill

10 The cumulative frequency graph gives information about the number of minutes each of 60 people was in a shop.

(a) Find an estimate for the number of people who were in the shop for more than 40 minutes.

P35



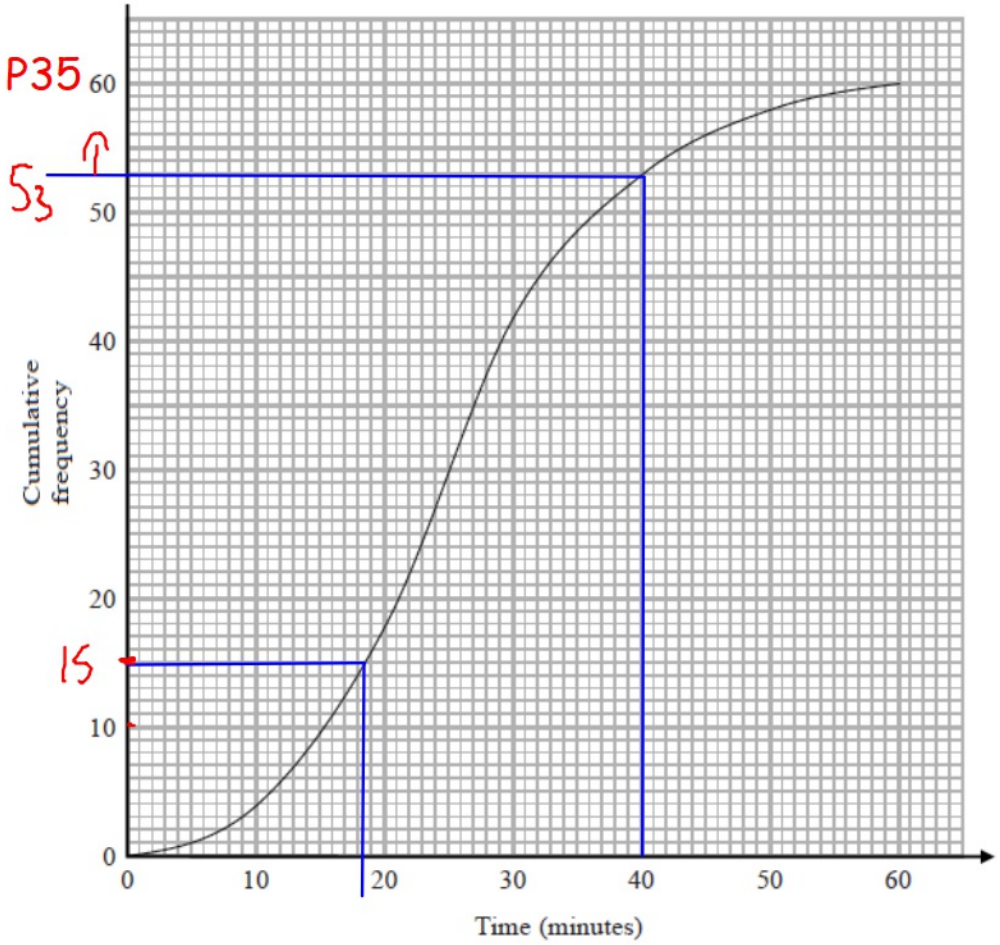
.....

(2)

Video created by W Neill

10 The cumulative frequency graph gives information about the number of minutes each of 60 people was in a shop.

(a) Find an estimate for the number of people who were in the shop for more than 40 minutes.



7

(2)

60 − 53

= 7 ✓

Stan has to use the graph to find an estimate for the lower quartile of the times.

Stan writes,

60 people were in the shop.
25% of 60 = 15
So the lower quartile of the times is 15 minutes.

(b) What mistake has Stan made?

.....

.....

.....

(1)

Stan has to use the graph to find an estimate for the lower quartile of the times.

Stan writes,

60 people were in the shop.
¼ 25% of 60 = 15
So the lower quartile of the times is 15 minutes.

(b) What mistake has Stan made?

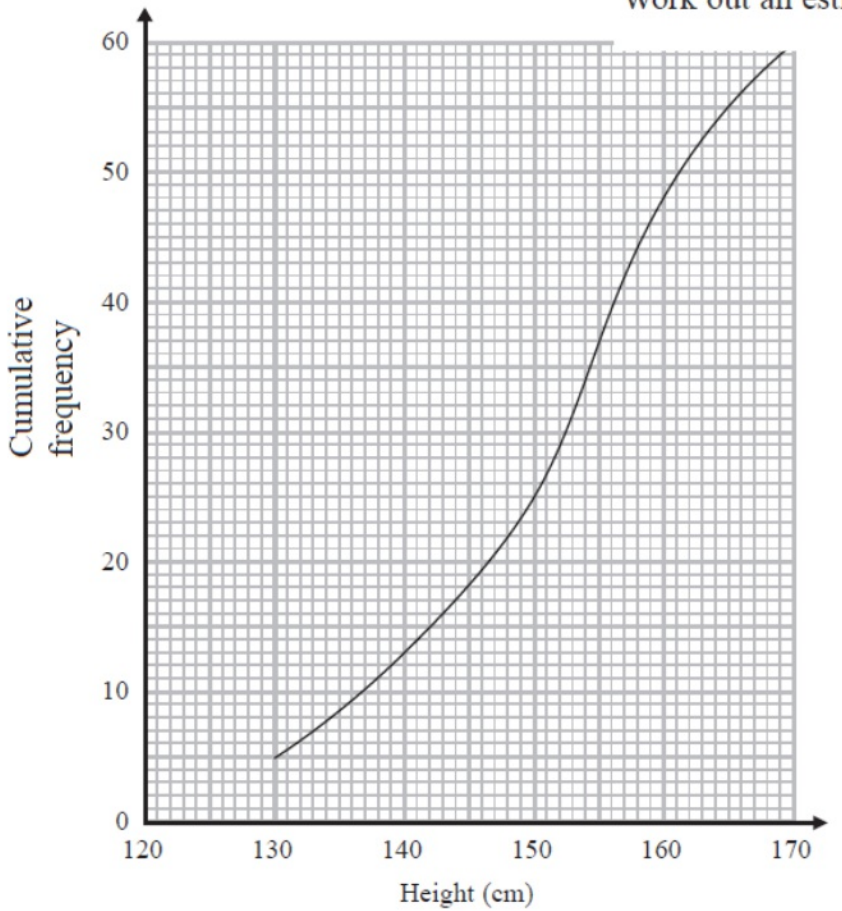
Stan needs to use 15 on CF axis to get the median. eg 18.5min

(1)

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

Video created by W Neill

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



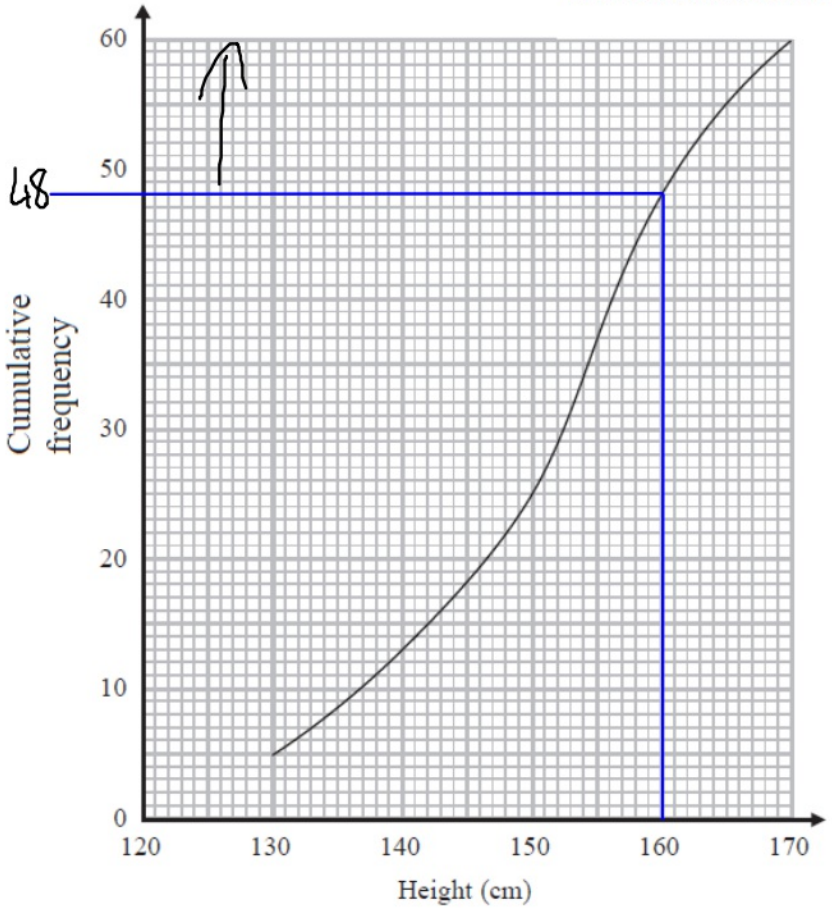
.....

(Total for Question 8 is 2 marks)

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

Video created by W Neill

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



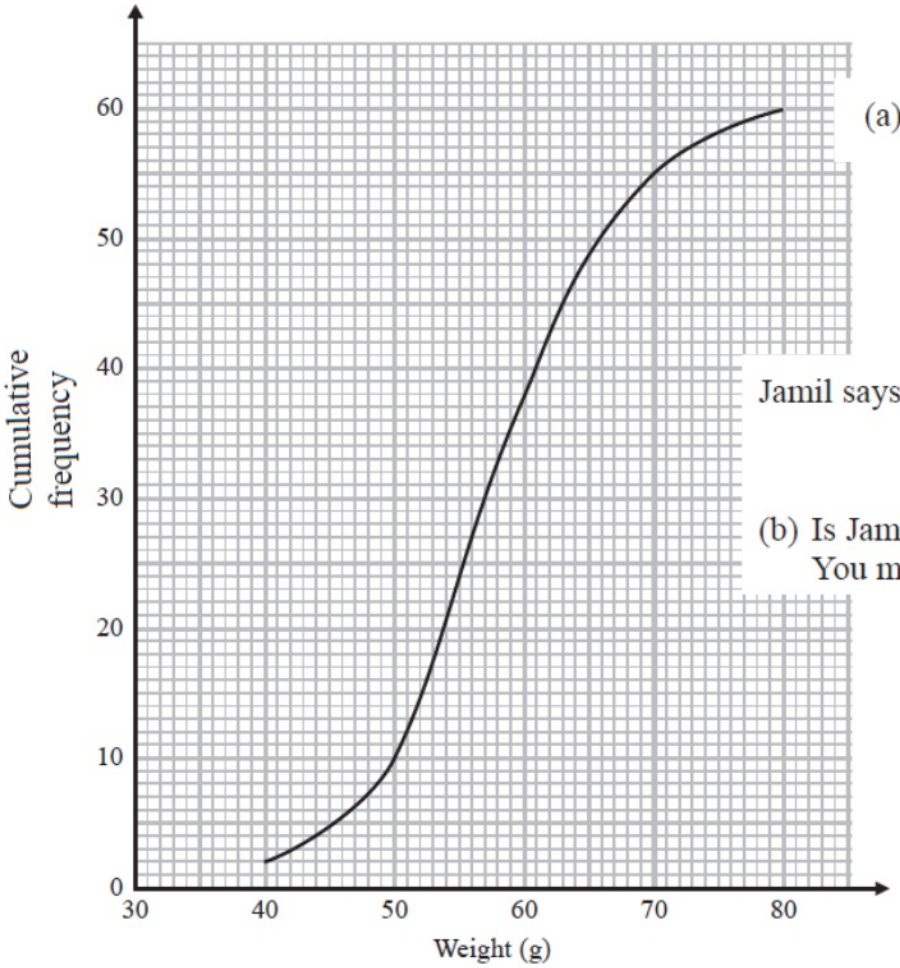
48 - 60

12 students

(Total for Question 8 is 2 marks)

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

Created by W Neill



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

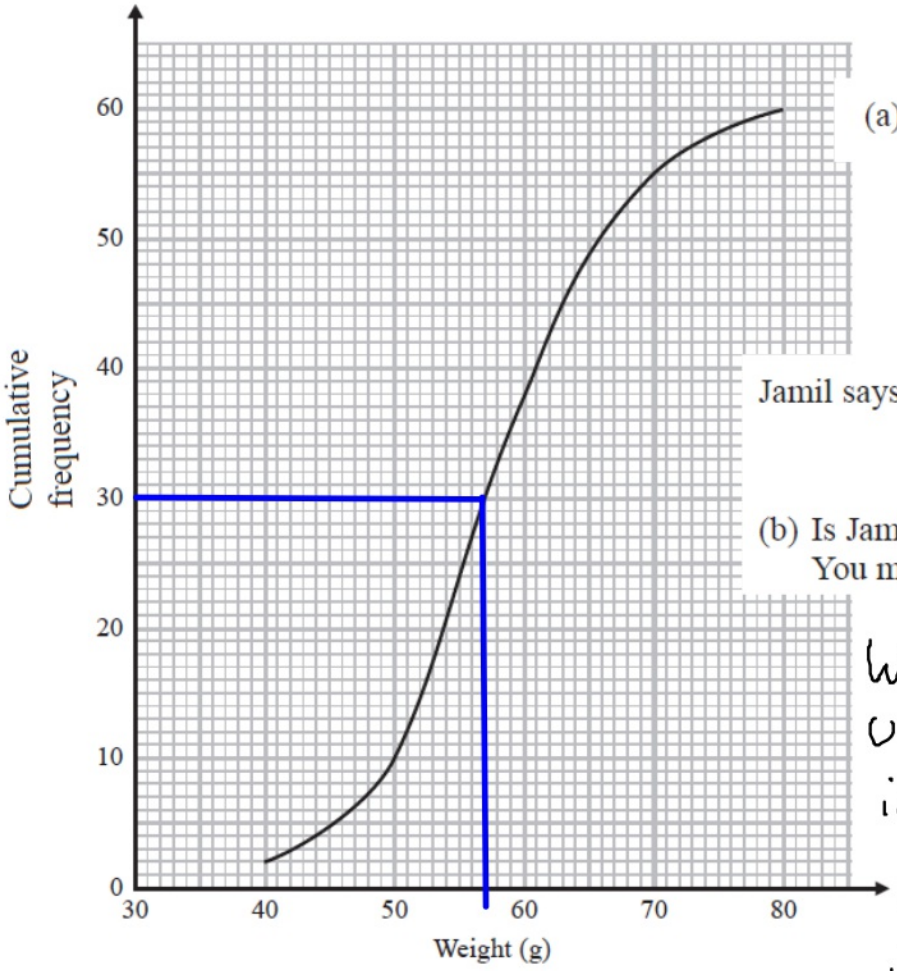
Jamil says,

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

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

Created by W Neill

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



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

57g

Jamil says,

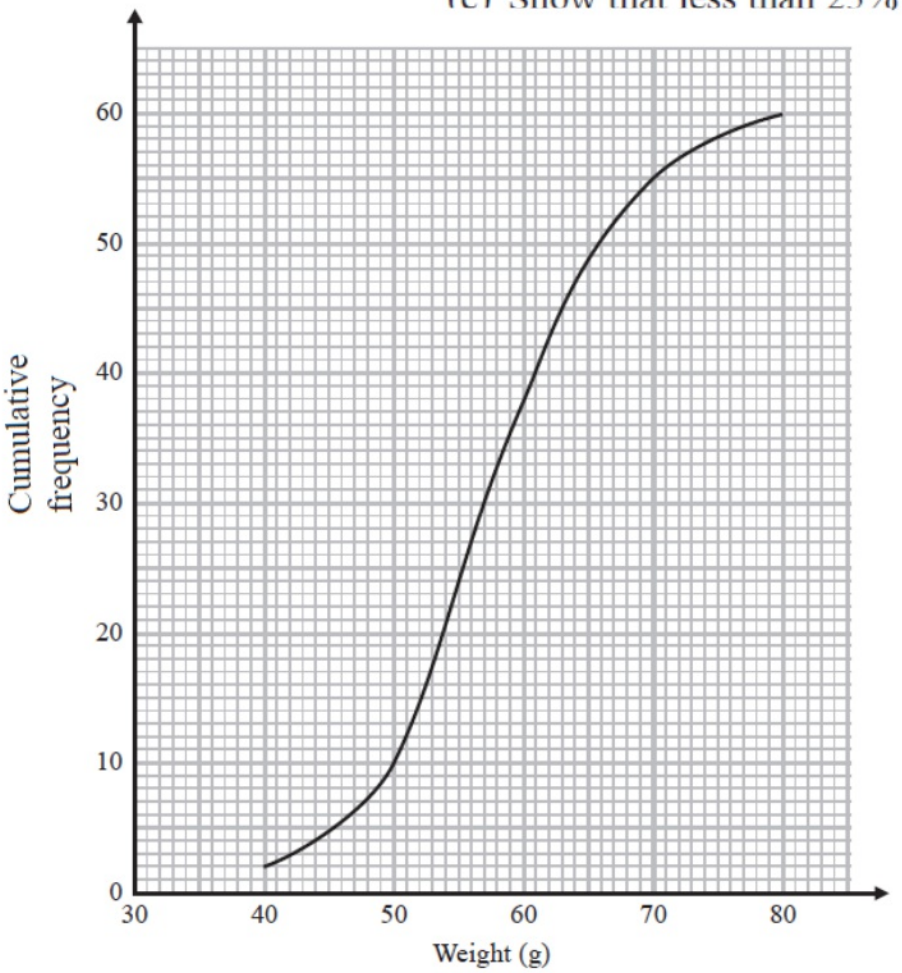
"80 − 40 = 40 so the range of the weights is 40 g."

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

When drawing a Cum Frequency graph you use the highest number within a class interval $70 \leq g < 80$

So he could be incorrect as maybe the weight of a potatoe is < than 80g

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



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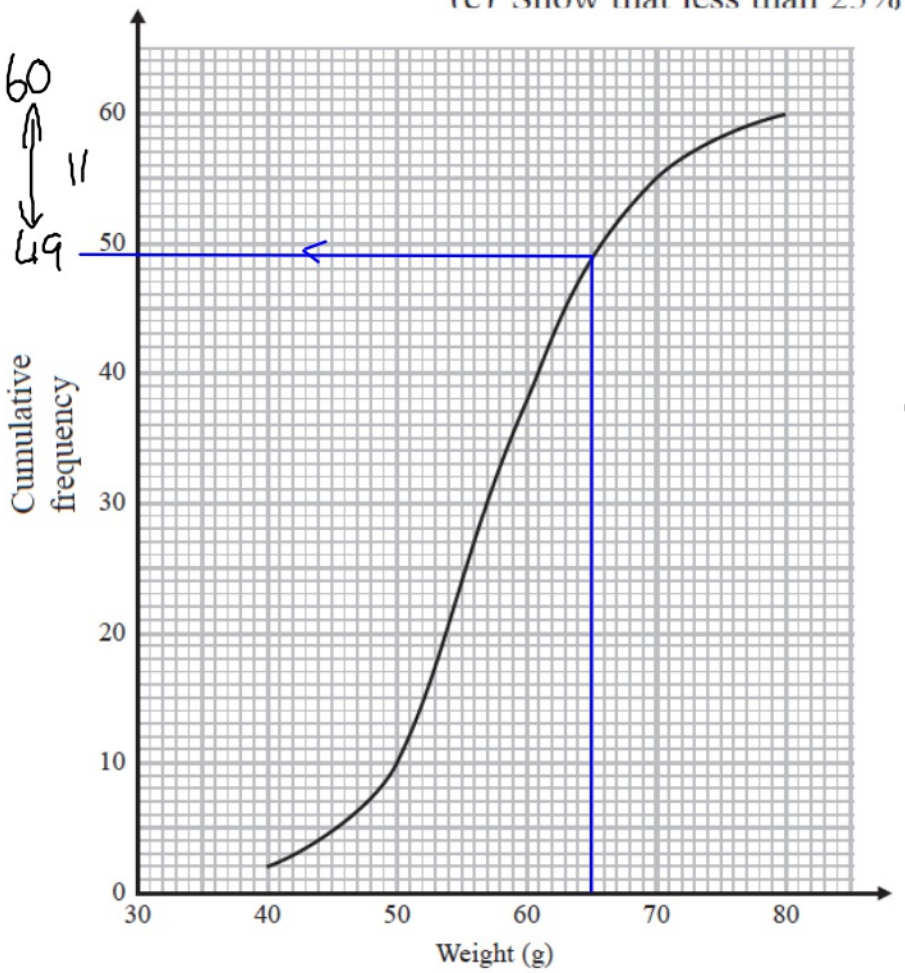
(c) Show that less than 25% of the potatoes have a weight greater than 65 g.



25% of 60 potatoes = 15 potatoes

11 potatoes are greater than 65g

$11 < 15$ ✓

Video Created by W Neill

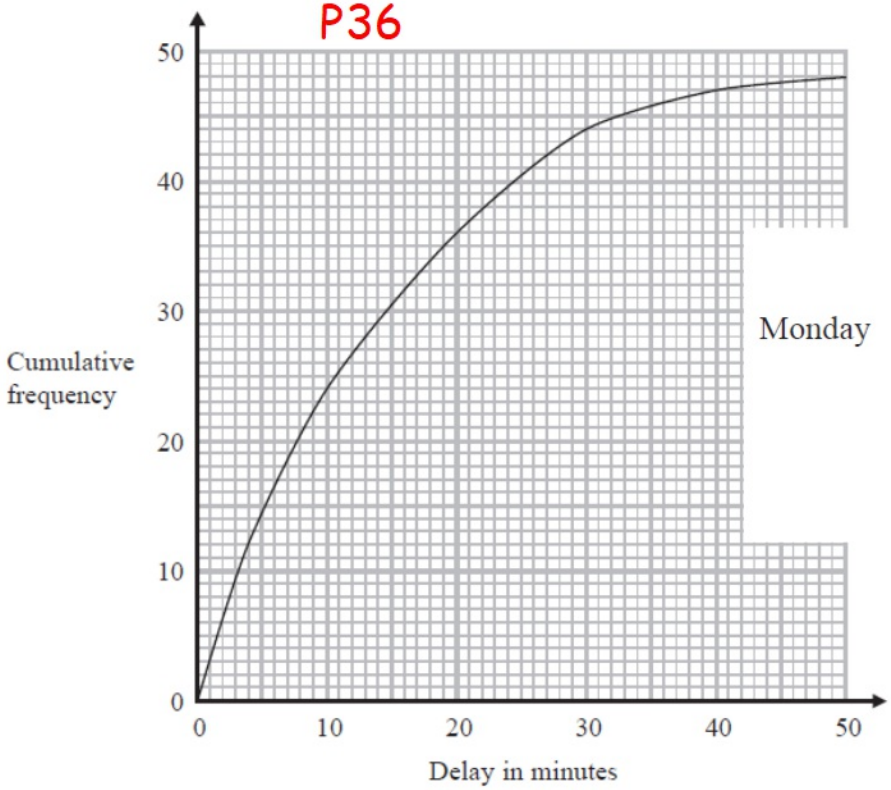
9 The times that 48 trains left a station on Monday were recorded.

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

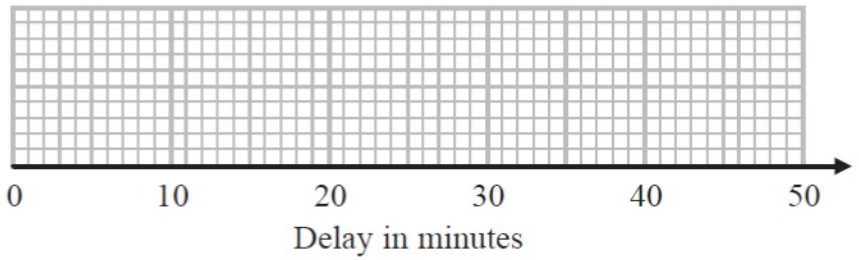
(a) On the grid below, draw a box plot for the information about the delays on Monday.

P35

P36



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



(3)

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

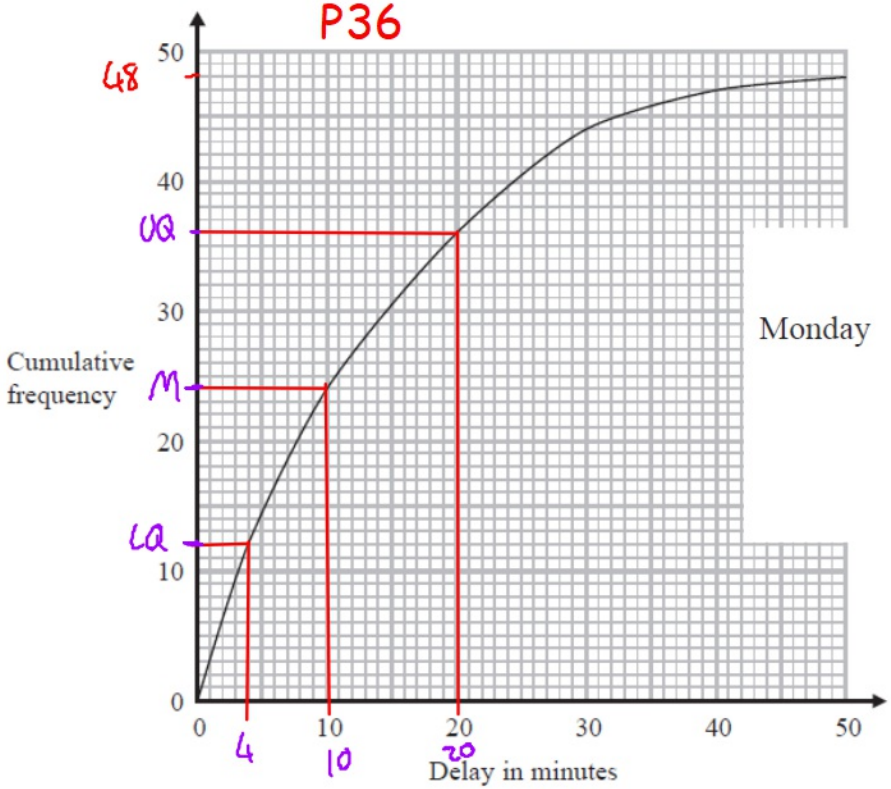
Video Created by W Neill

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

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

P35

P36



The shortest delay was 0 minutes.
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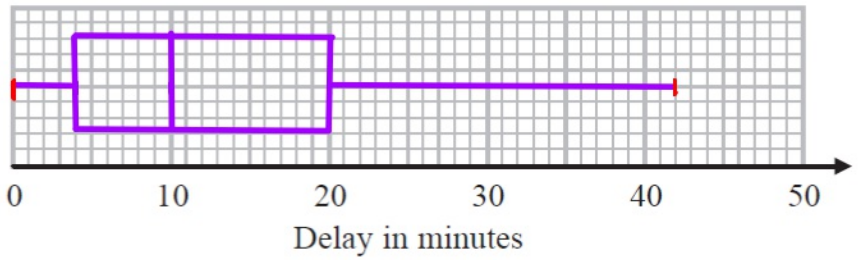
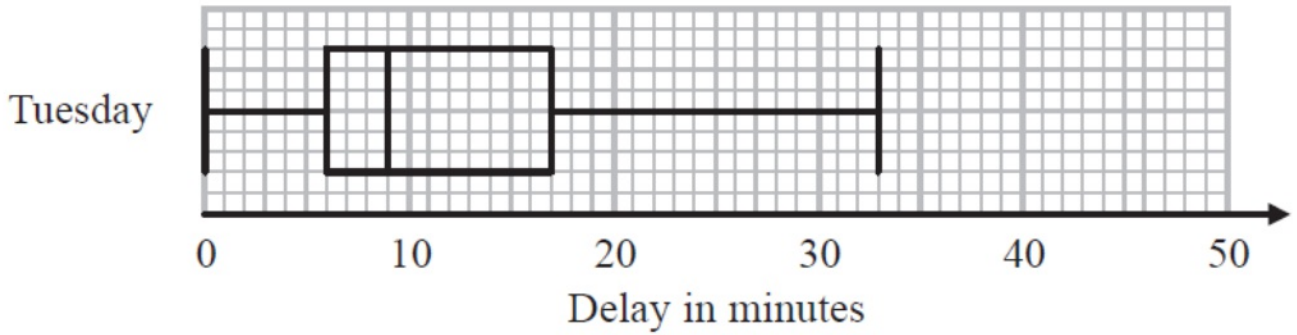


(3)

Video Created by W Neill

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



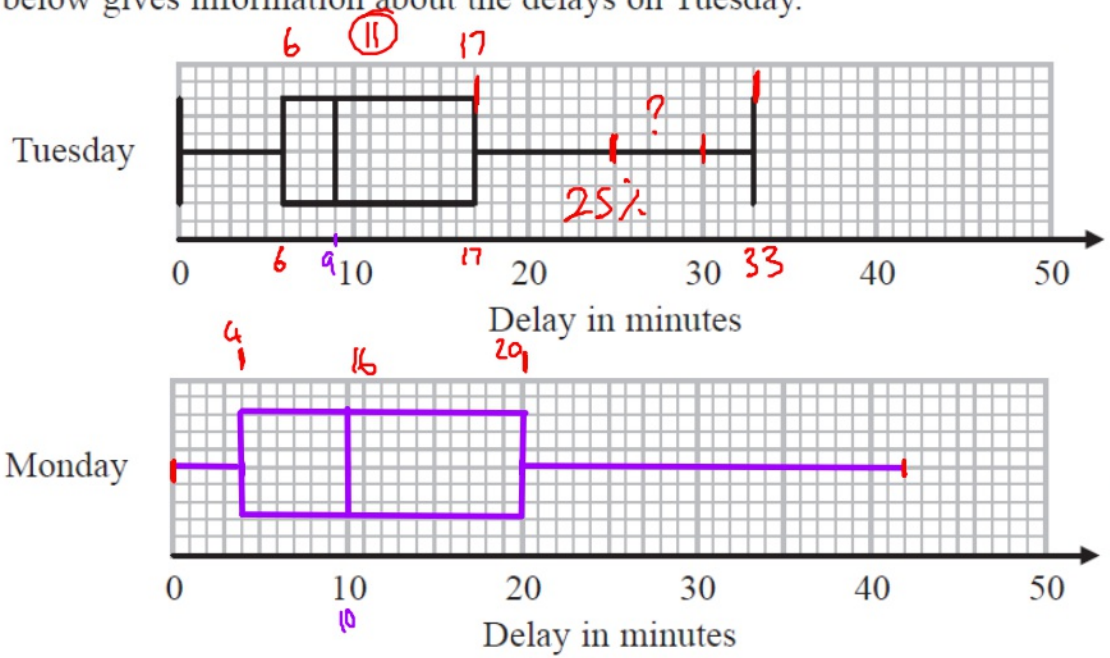
(b) Compare the distribution of the delays on Monday with the distribution of the delays on Tuesday.

P37

(2)

Video Created by W Neill

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



On Mon the IQR is 16 min and on Tuesday the IQR is 11 min, therefore train delays are more spread out on Monday. ✓

(3)

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

P37

Median was 9 min on Tues and 10 min on Monday. Therefore we can say trains were later on Monday. ✓

(2)

Video Created by W Neill

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.

P36

.....

.....

(1)

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.

P36

You don't know where the data is situated in a boxplot. Therefore Mary is incorrect.

(1)

AQA

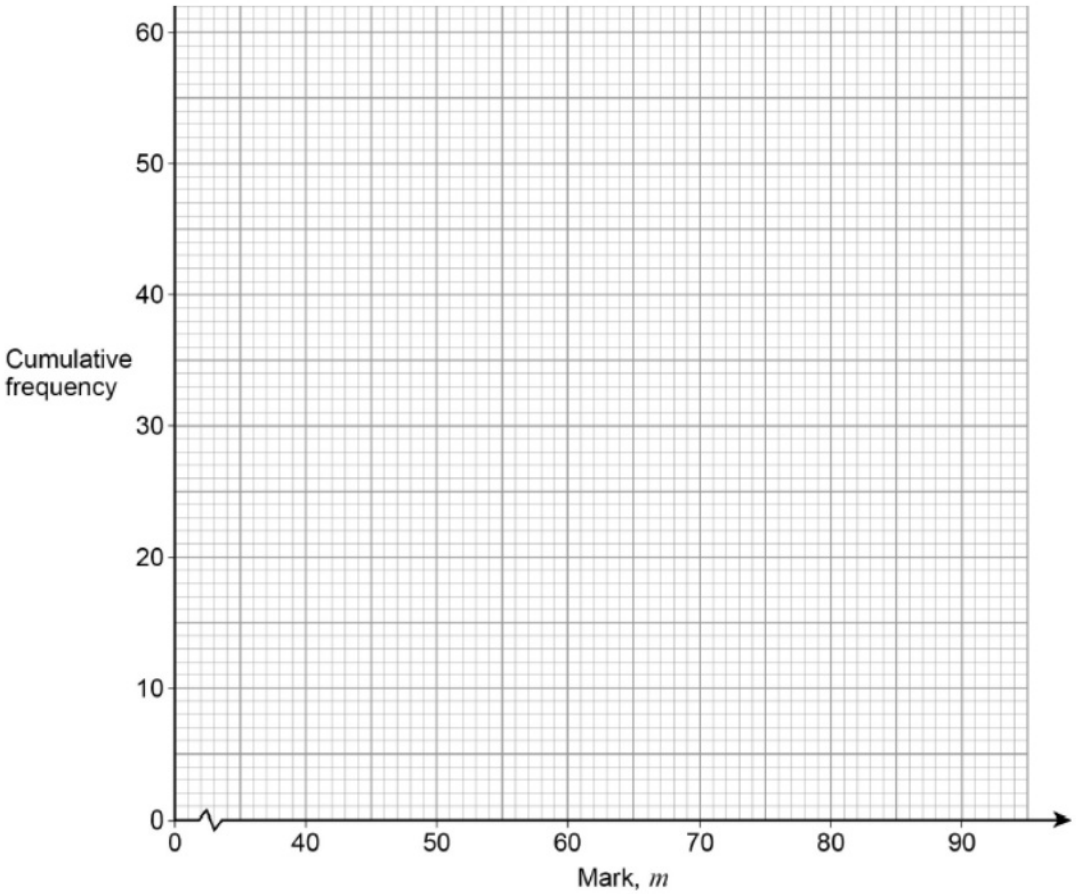
19 Here is some information about the marks of 60 students in a test.

Video created by W Neill

Mark, m	Frequency
$40 < m \leqslant 50$	9
$50 < m \leqslant 60$	16
$60 < m \leqslant 70$	20
$70 < m \leqslant 80$	8
$80 < m \leqslant 90$	7

19 (a) On the grid, draw a cumulative frequency graph.

P35



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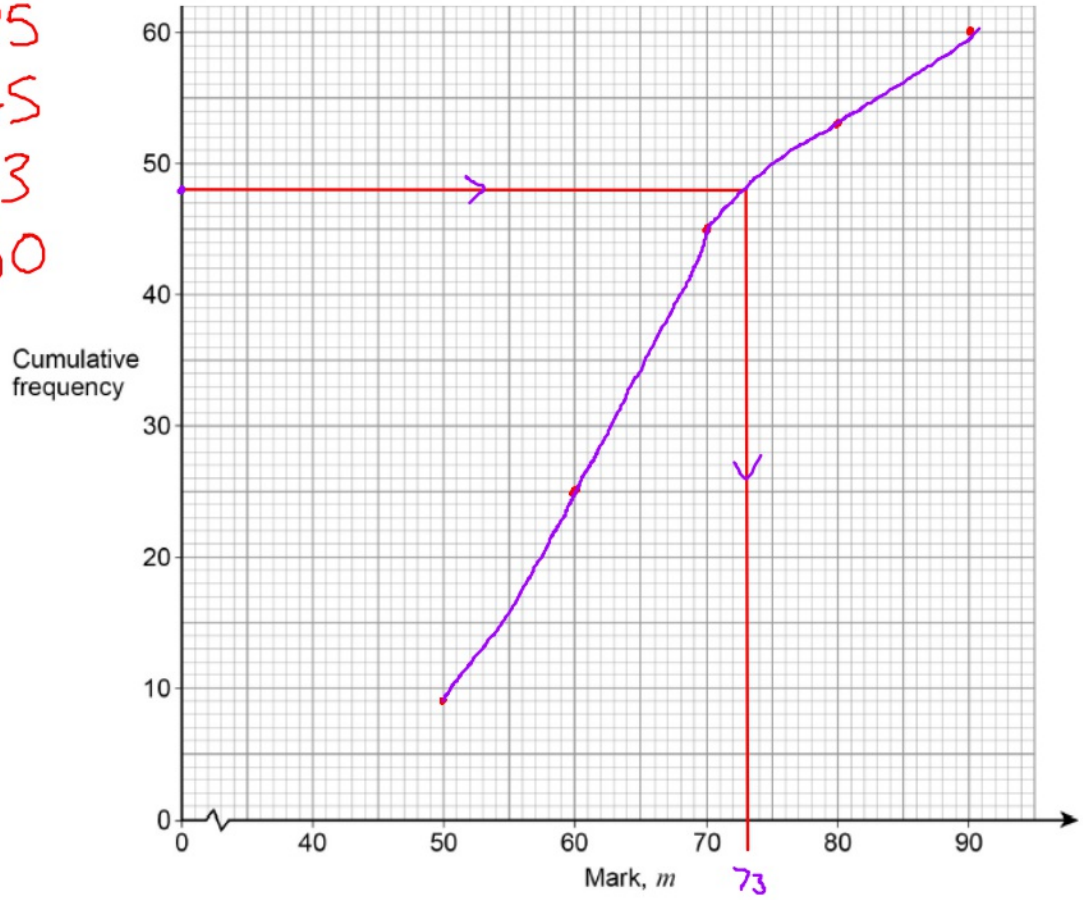
Video created by W Neill

Mark, m	Frequency	CF
$40 < m \leqslant 50$	9	9
$50 < m \leqslant 60$	16	25
$60 < m \leqslant 70$	20	45
$70 < m \leqslant 80$	8	53
$80 < m \leqslant 90$	7	60

40 → 50	
40 → 60	
40 → 70	
40 → 80	
40 → 90	

19 (a) On the grid, draw a cumulative frequency graph.

P35



Video created by W Neill

19 (b) Use your graph to estimate the lowest mark of the top 20% of students.

[2 marks]

P35
R7

Answer _____

Video created by W Neill

19 (b) Use your graph to estimate the lowest mark of the top 20% of students.

[2 marks]

P35
R7

60 students 20% of 60

10% = 6

20% = 12 students

Answer 73 marks

73 → 75 marks ✓

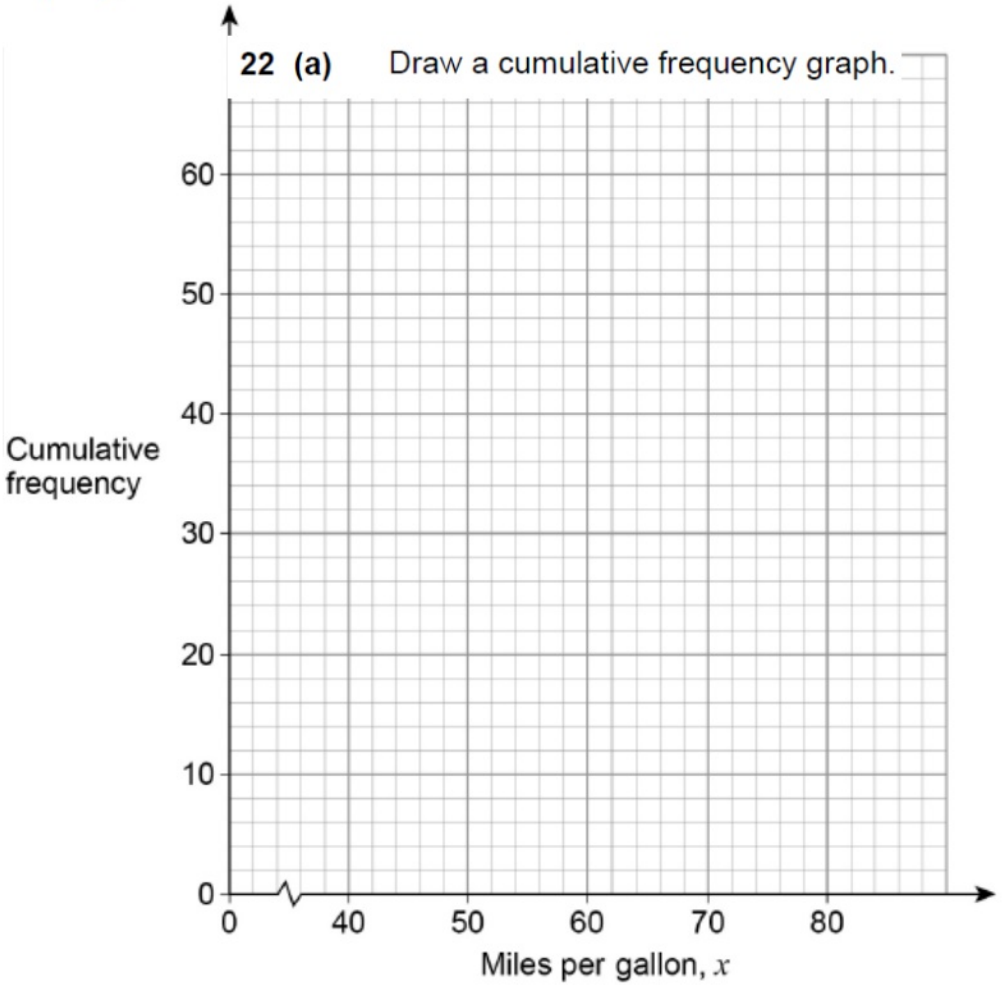
Video created by W Neill

22 Here is some information about the miles per gallon of 60 cars.

P35

Miles per gallon, x	Frequency
$40 < x \leqslant 50$	6
$50 < x \leqslant 60$	16
$60 < x \leqslant 70$	28
$70 < x \leqslant 80$	10

22 (a) Draw a cumulative frequency graph.



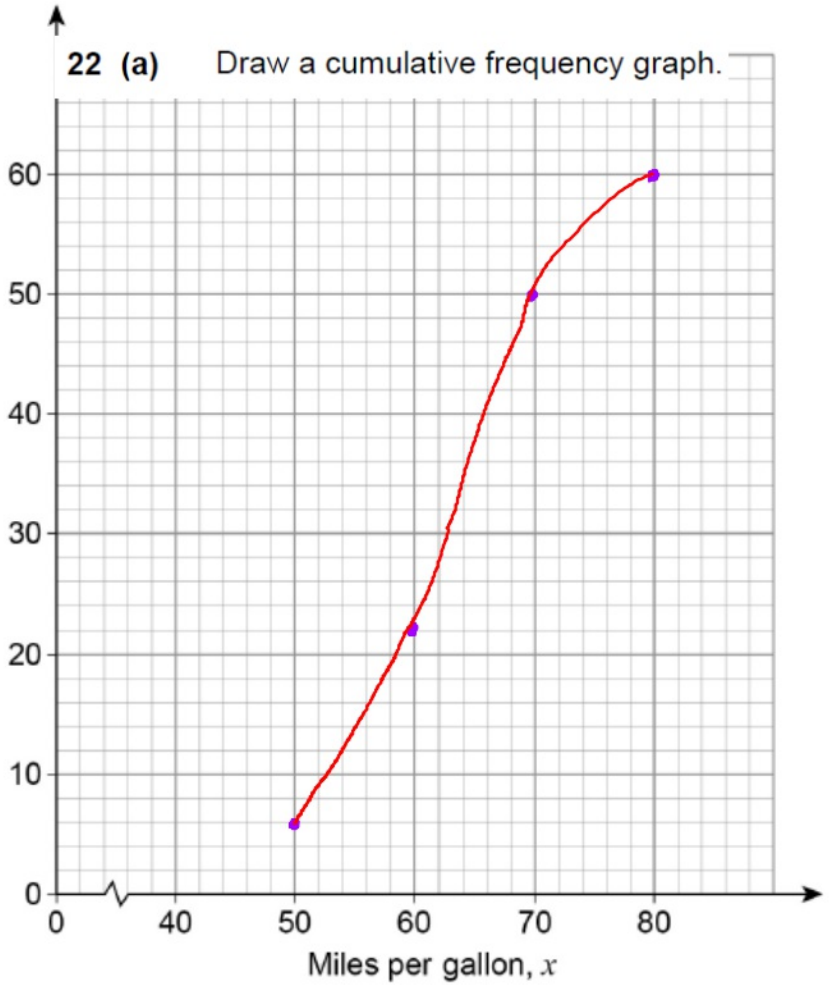
Video created by W Neill

22 Here is some information about the miles per gallon of 60 cars.

P35

Miles per gallon, x	Frequency	CF
$40 < x \leqslant 50$	6	6
$50 < x \leqslant 60$	16	22
$60 < x \leqslant 70$	28	50
$70 < x \leqslant 80$	10	60

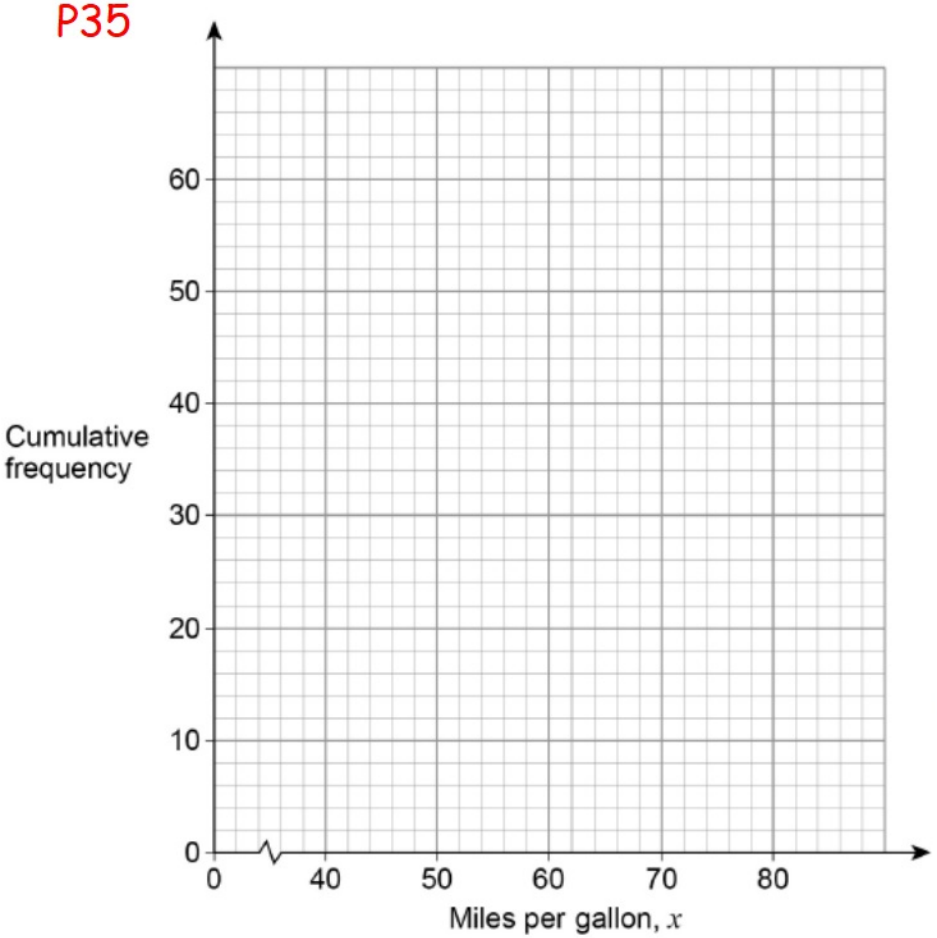
22 (a) Draw a cumulative frequency graph.



Video created by W Neill

22 (b) Use the graph to work out the interquartile range. **[2 marks]**

P35

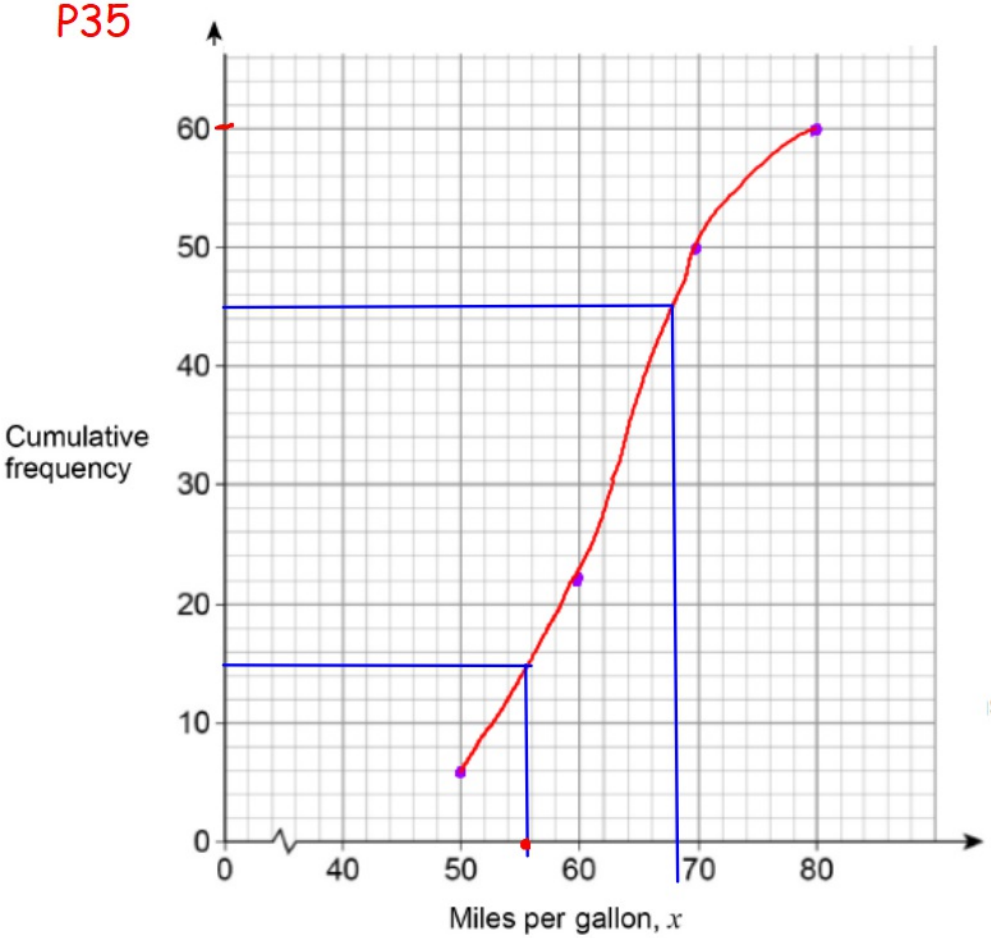


Answer _____ miles per gallon

Video created by W Neill

22 (b) Use the graph to work out the interquartile range. **[2 marks]**

P35



UQ - LQ

45th 15th

68 - 56 IQR

12

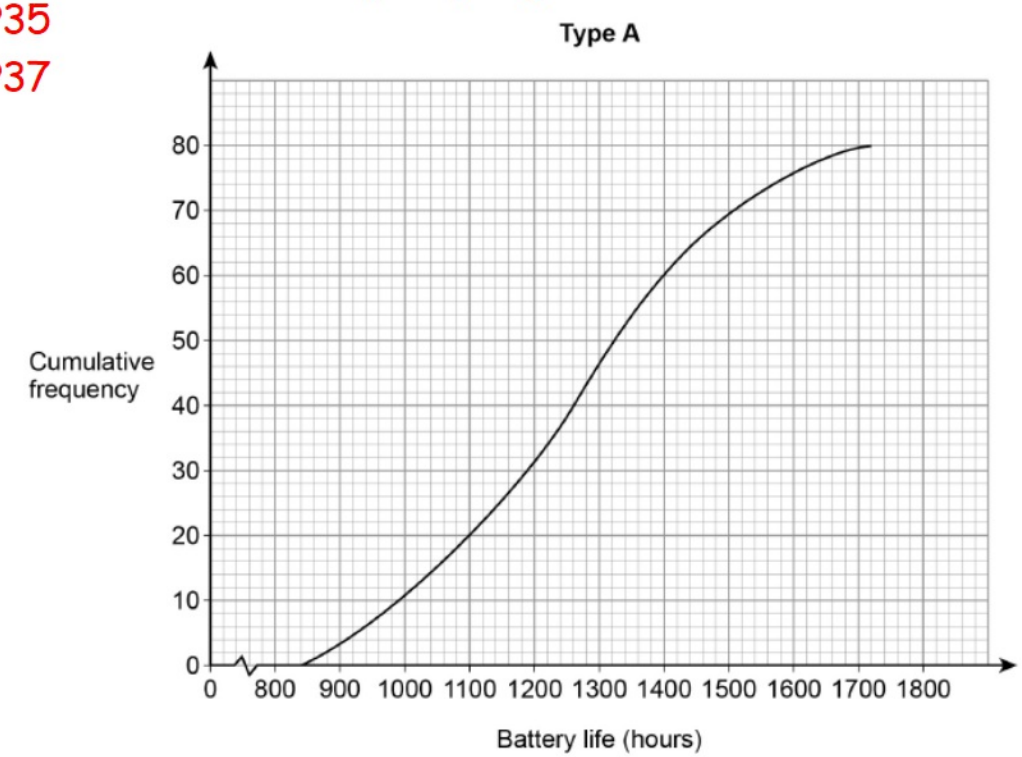
Answer _____ miles per gallon

Video created by W Neill

19 Type A batteries and type B batteries were tested.

The cumulative frequency diagram shows information about the battery life of type A.

P35
P37



19 (a) Estimate the interquartile range for type A. **[2 marks]**

P35

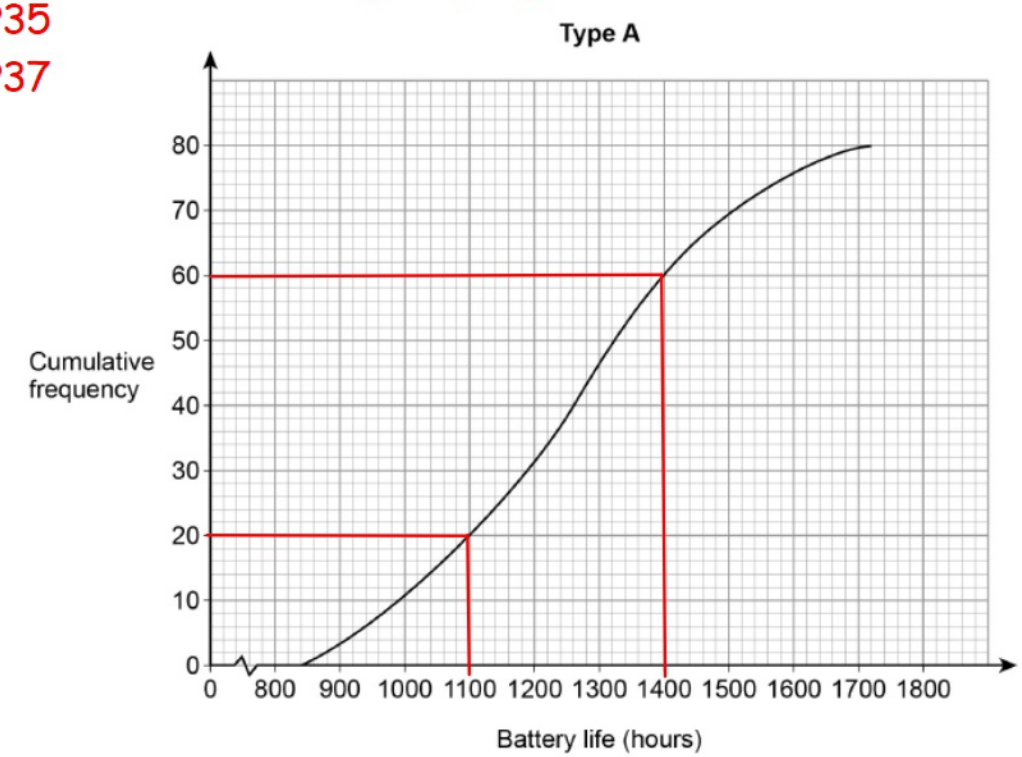
Answer _____ hours

Video created by W Neill

19 Type A batteries and type B batteries were tested.

The cumulative frequency diagram shows information about the battery life of type A.

P35
P37



UQ - LQ

1400 - 1100

19 (a) Estimate the interquartile range for type A. **[2 marks]**

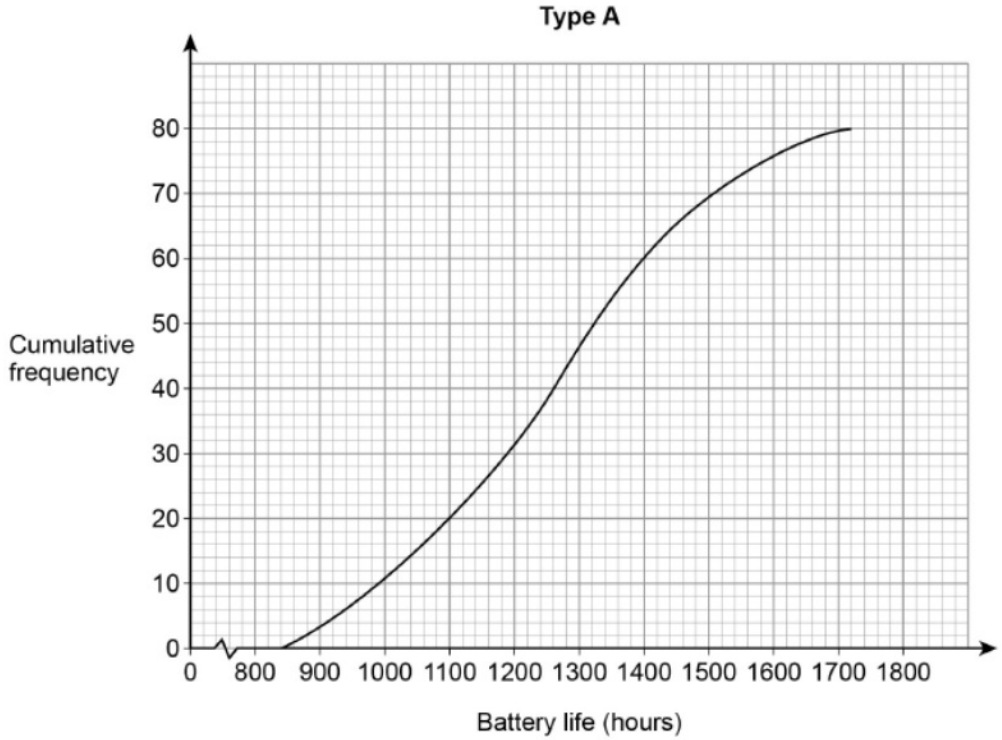
P35

Answer 300 ✓ hours

Video created by W Neill

19 Type A batteries and type B batteries were tested.

The cumulative frequency diagram shows information about the battery life of type A.



19 (b) Estimate the number of type A batteries that had a battery life of more than 1600 hours. **[1 mark]**

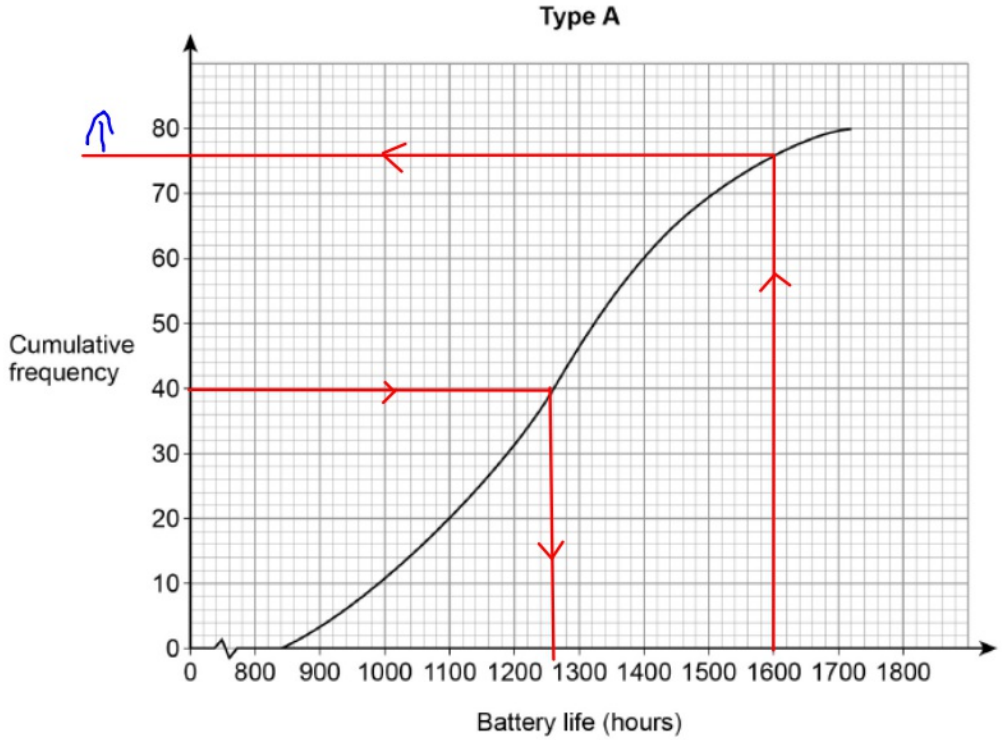
P35

Answer _____ hours

Video created by W Neill

19 Type A batteries and type B batteries were tested.

The cumulative frequency diagram shows information about the battery life of type A.



19 (b) Estimate the number of type A batteries that had a battery life of more than 1600 hours. **[1 mark]**

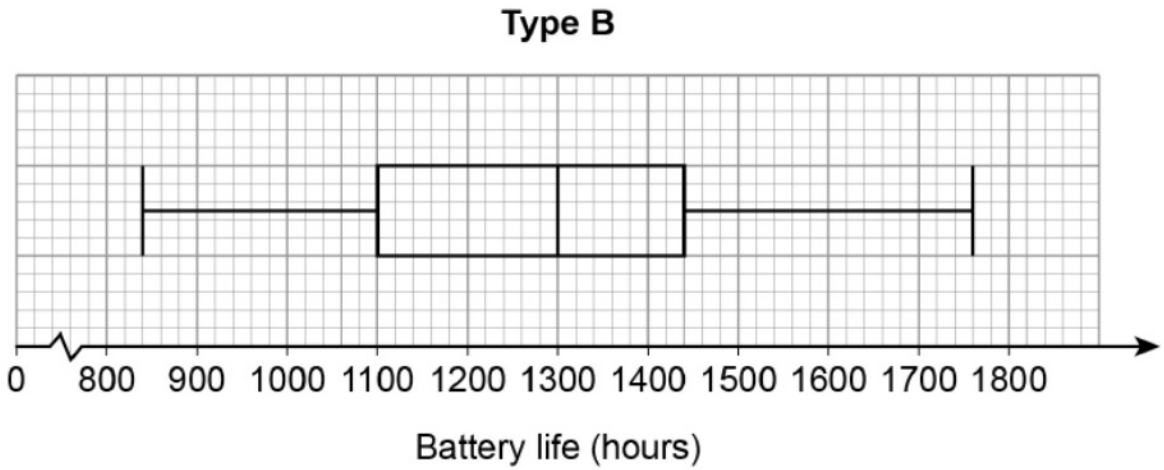
P35

Answer 4 ~~hours~~

Video created by W Neill

19 (c) The box plot shows information about the battery life of type B.

P37



On average, which type had the greater battery life?

Tick a box.

☐ type A ☐ type B

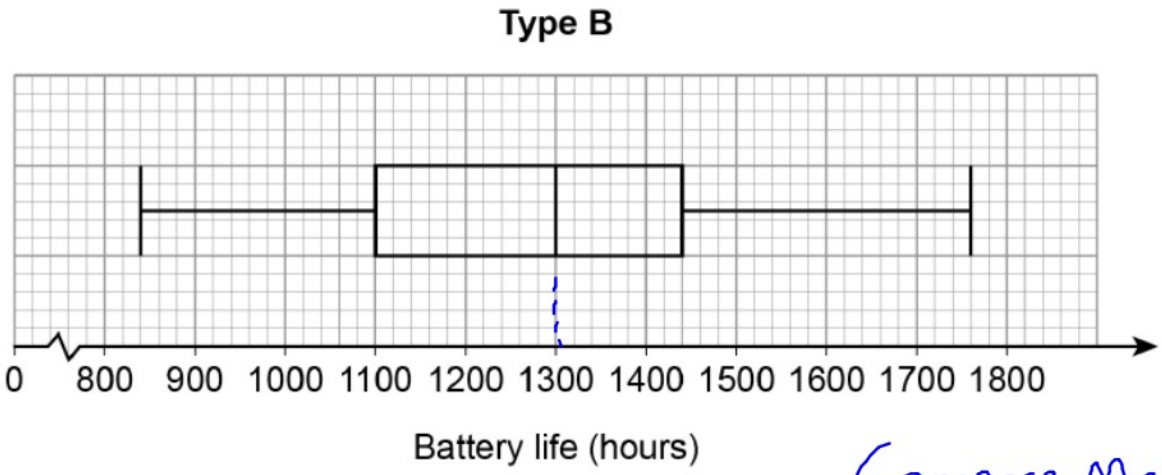
Using data from **both** diagrams, state how you chose your answer.

[2 marks]

Video created by W Neill

19 (c) The box plot shows information about the battery life of type B.

P37



On average, which type had the greater battery life?

Tick a box.

☐ type A ☑ type B

Using data from **both** diagrams, state how you chose your answer.

[2 marks]

Compare Medians

Type B median = 1300hrs

Type A " = 1260hrs

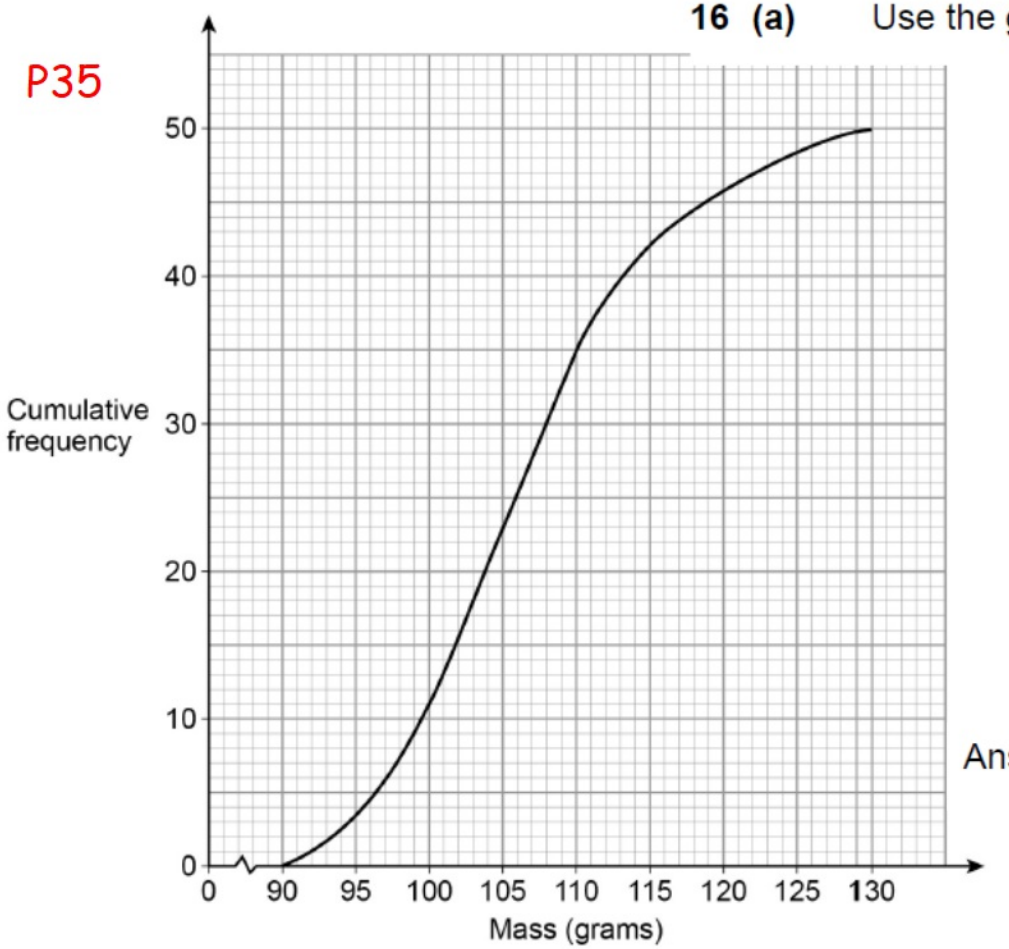
As type B median > Type A

the battery life is longer.

Video created by W Neill

16 The cumulative frequency graph shows information about the masses of 50 apples.

P35



16 (a) Use the graph to estimate the median mass of the apples.

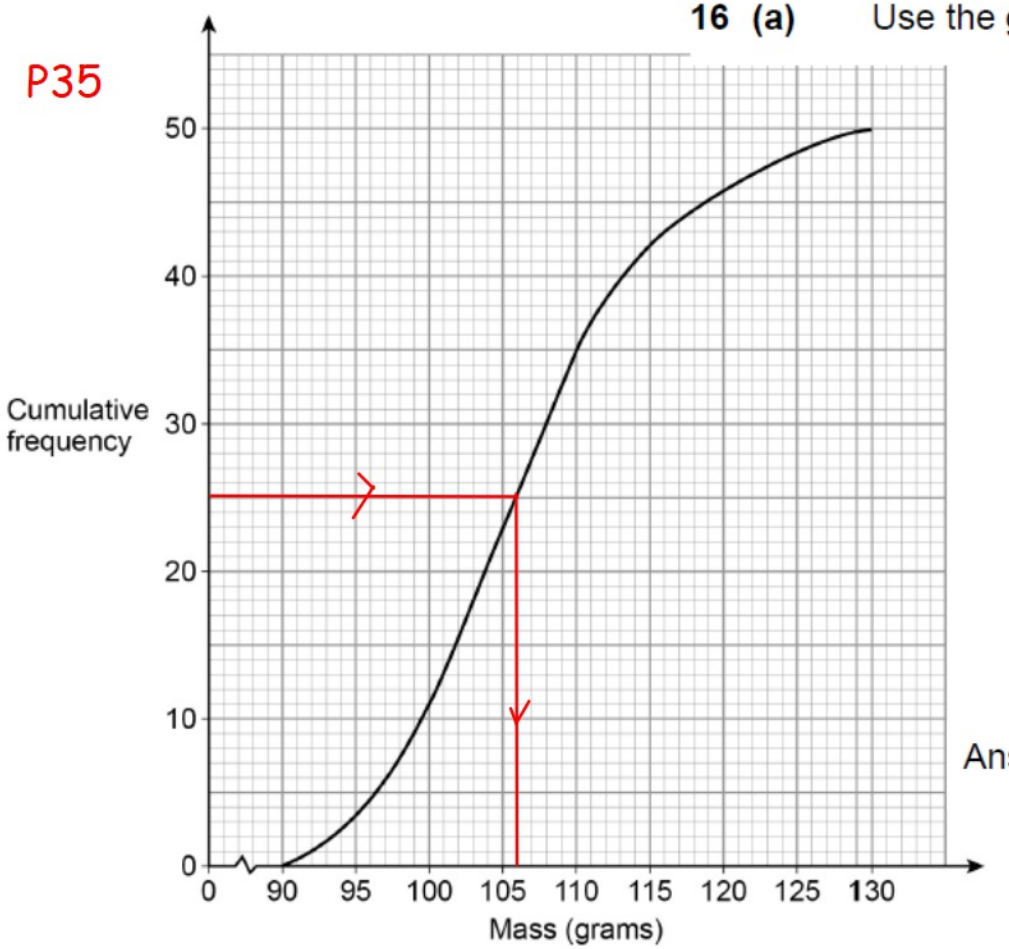
[1 mark]

Answer _____ grams

Video created by W Neill

16 The cumulative frequency graph shows information about the masses of 50 apples.

P35



16 (a) Use the graph to estimate the median mass of the apples.

[1 mark]

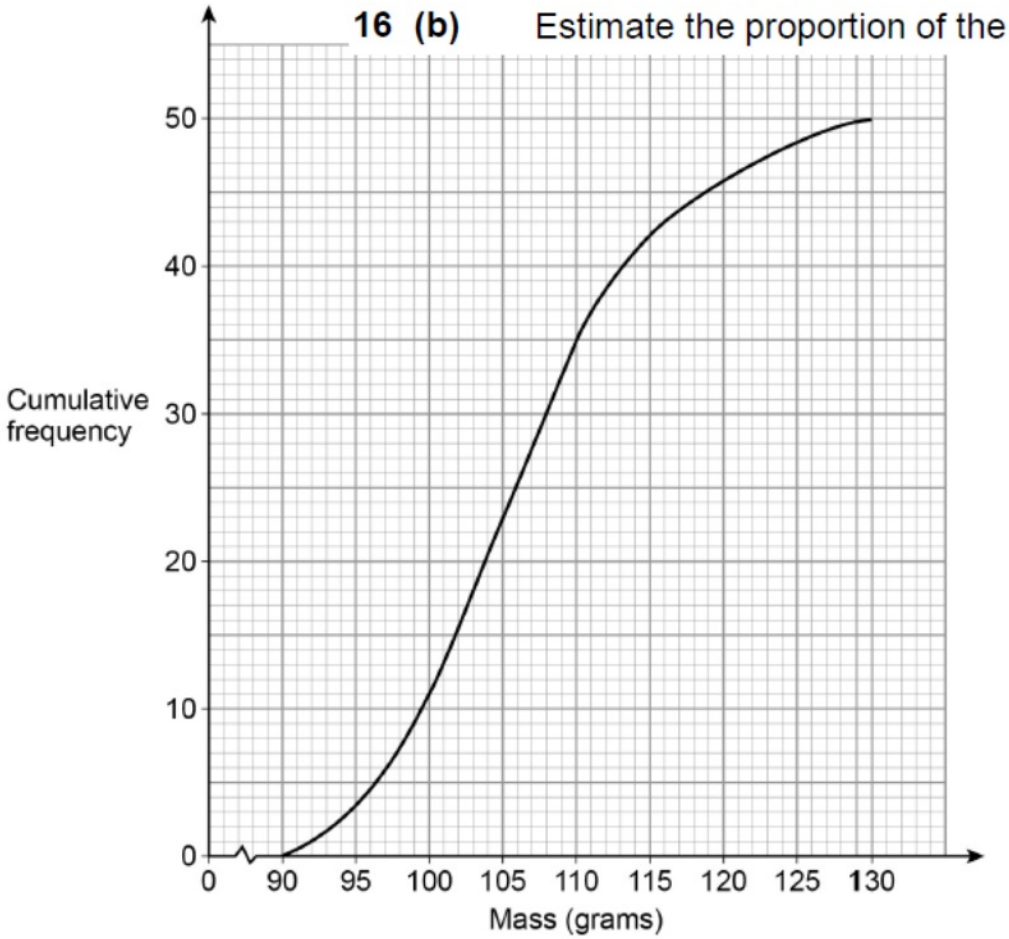
Answer 106 grams

Video created by W Neill

16 The cumulative frequency graph shows information about the masses of 50 apples.

16 (b) Estimate the proportion of the apples that have a mass greater than 115 grams.

[2 marks]



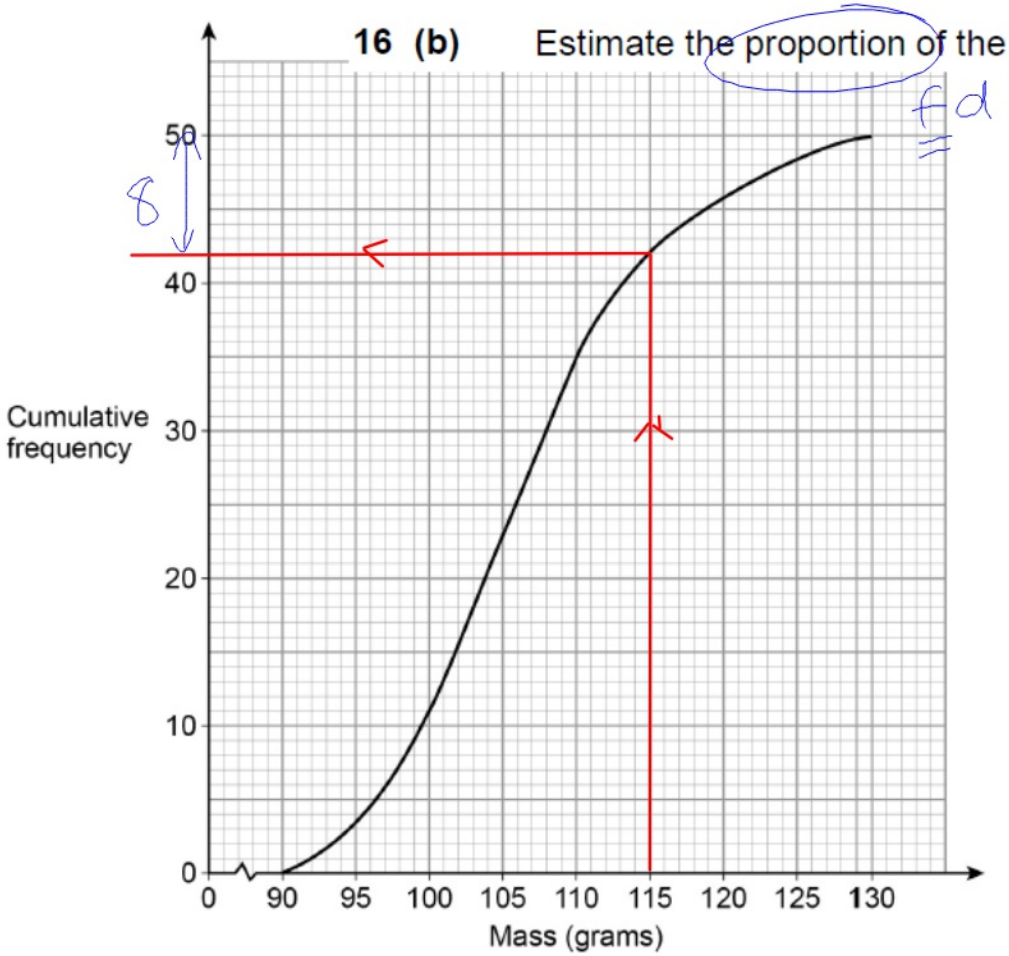
Answer _____

Video created by W Neill

16 The cumulative frequency graph shows information about the masses of 50 apples.

16 (b) Estimate the proportion of the apples that have a mass greater than 115 grams.

[2 marks]



Answer 8/50