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EDEXCEL GCSE (9-1) MATHS: QUESTIONS BY TOPIC

Statistics (S1)

GCSE (9-1) Mathematics (1MA1) · Higher tier

84 questions · 315 marks · Mark schemes included

Past papers June 2017 - June 2025 · 5 sub-topics

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 Piccadilly Business Centre, Unit C, Aldow Enterprise Park
Blackett Street, Manchester, M12 6AE

HOW TO USE THIS BOOKLET

Questions are grouped by sub-topic and run from the lowest to the highest mark tariff, then oldest paper first.

Click any row below to jump straight to that sub-topic or question.

On every question page, click ANSWER in the top-right corner to jump to its mark scheme; < QUESTION brings you back.

A gold bar in the left margin marks exactly where the question sits on the original page.

Diagrams, graphs, grids and tables are printed exactly as they appear in the original papers.

Each question is filed under its main topic; longer questions may also test skills from other topics.

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QUESTIONS

84 questions · 315 marks · 5 sub-topics

SUB-TOPIC S1a

DATA COLLECTION & SAMPLING

Sub-topic S1a · 8 questions · 27 marks · lowest tariff first



- 11 There are p counters in a bag.
12 of the counters are yellow.

Shafiq takes at random 30 counters from the bag.
5 of these 30 counters are yellow.

Work out an estimate for the value of p .

(Total for Question 11 is 2 marks)

12 $T = \frac{q}{2} + 5$

Here is Spencer's method to make q the subject of the formula.

$$2 \times T = q + 5$$

$$q = 2T - 5$$

What mistake did Spencer make in the first line of his method?

(Total for Question 12 is 1 mark)



3 Hannah is planning a day trip for 195 students.

She asks a sample of 30 students where they want to go.
Each student chooses one place.

The table shows information about her results.

Place	Number of students
Theme Park	10
Theatre	5
Sports Centre	8
Seaside	7

(i) Work out how many of the 195 students you think will want to go to the Theme Park.

.....
(2)

(ii) State any assumption you made **and** explain how this may affect your answer.

.....
.....
.....
(1)

(Total for Question 3 is 3 marks)



- 4 Each person in a fitness club is going to get a free gift.
Stan is going to order the gifts.

Stan takes a sample of 50 people in the fitness club.
He asks each person to tell him the gift they would like.

The table shows information about his results.

Gift	Number of people
sports bag	17
gym towel	7
headphones	11
voucher	15

There are 700 people in the fitness club.

- (i) Work out how many sports bags Stan should order.

.....
(2)

- (ii) Write down any assumption you made **and** explain how this could affect your answer.

.....
.....
.....
.....
(1)

(Total for Question 4 is 3 marks)



14 Saffron wants to work out an estimate for the total number of fish in a lake.

On Friday, Saffron catches 180 fish from the lake.

She puts a tag on each of these fish and puts them back into the lake.

On Saturday, Saffron catches 305 fish from the same lake.

She finds that 45 of the 305 fish are tagged.

Work out an estimate for the total number of fish in the lake.

(Total for Question 14 is 3 marks)



- 13** A factory makes 450 pies every day.
The pies are chicken pies or steak pies.

Each day Milo takes a sample of 15 pies to check.

The proportion of the pies in his sample that are chicken is the same as the proportion of the pies made that day that are chicken.

On Monday Milo calculated that he needed exactly 4 chicken pies in his sample.

- (a) Work out the total number of chicken pies that were made on Monday.

.....
(2)

On Tuesday, the number of steak pies Milo needs in his sample is 6 correct to the nearest whole number.

Milo takes at random a pie from the 450 pies made on Tuesday.

- (b) Work out the lower bound of the probability that the pie is a steak pie.

.....
(2)

(Total for Question 13 is 4 marks)



16 Shirley wants to find an estimate for the number of bees in her hive.

On Monday she catches 90 of the bees.

She puts a mark on each bee and returns them to her hive.

On Tuesday she catches 120 of the bees.

She finds that 20 of these bees have been marked.

(a) Work out an estimate for the total number of bees in her hive.

.....
(3)

Shirley assumes that none of the marks had rubbed off between Monday and Tuesday.

(b) If Shirley's assumption is wrong, explain what effect this would have on your answer to part (a).

.....
.....
.....
(1)

(Total for Question 16 is 4 marks)



- 15** Faiza is studying the population of rabbits in a park.
She wants to estimate the number of rabbits in the park.

On Monday she catches a random sample of 20 rabbits in the park, marks each rabbit with a tag and releases them back into the park.

On Tuesday she catches a random sample of 42 rabbits in the park.
12 of the rabbits are marked with a tag.

- (a) Find an estimate for the number of rabbits in the park.

.....
(3)

Albie is studying the population of rabbits in a wood.

One day, he catches 55 rabbits and finds that 40 of these rabbits are marked with a tag.

Albie estimates there are 50 rabbits in the wood.

- (b) Explain why Albie's estimate cannot be correct.

.....
.....
.....
(1)

(Total for Question 15 is 4 marks)



18 Maria wants to find an estimate for the number of frogs in a lake.

On Saturday she catches 40 of the frogs.
She puts a tag on each frog and releases them.

On Monday she catches 55 of the frogs.
11 of the frogs have tags.

- (a) Work out an estimate for the total number of frogs in the lake.
You must show all your working.

.....
(3)

- (b) State one assumption you have made.

.....
.....
.....
(1)

.....
(Total for Question 18 is 4 marks)



SUB-TOPIC S1b

AVERAGES & RANGE

Sub-topic S1b · 15 questions · 47 marks · lowest tariff first



- 8 The grouped frequency table gives information about the time, in minutes, taken by 50 people to solve a puzzle.

Time (t minutes)	Frequency
$0 < t \leq 10$	5
$10 < t \leq 20$	8
$20 < t \leq 30$	12
$30 < t \leq 40$	15
$40 < t \leq 50$	7
$50 < t \leq 60$	3

Brian was asked to draw a cumulative frequency table for this information.

This is the table that Brian drew.

Time (t minutes)	Cumulative frequency
$0 < t \leq 10$	5
$10 < t \leq 20$	13
$20 < t \leq 30$	25
$30 < t \leq 40$	40
$40 < t \leq 50$	47
$50 < t \leq 60$	50

Write down **one** thing that is wrong with this cumulative frequency table.

.....

.....

.....

(Total for Question 8 is 1 mark)



3 The table shows some information about the dress sizes of 25 women.

Dress size	Number of women
8	2
10	9
12	8
14	6

(a) Find the median dress size.

.....
(1)

3 of the 25 women have a shoe size of 7

Zoe says that if you choose at random one of the 25 women, the probability that she has either a shoe size of 7 or a dress size of 14 is $\frac{9}{25}$ because

$$\frac{3}{25} + \frac{6}{25} = \frac{9}{25}$$

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

.....
.....
(1)

(Total for Question 3 is 2 marks)

- 7 There are 10 boys and 20 girls in a class.
The class has a test.

The mean mark for all the class is 60

The mean mark for the girls is 54

Work out the mean mark for the boys.

.....
(Total for Question 7 is 3 marks)

- 8 (a) Write 7.97×10^{-6} as an ordinary number.

.....
(1)

- (b) Work out the value of $(2.52 \times 10^5) \div (4 \times 10^{-3})$
Give your answer in standard form.

.....
(2)

.....
(Total for Question 8 is 3 marks)



Answer ALL questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

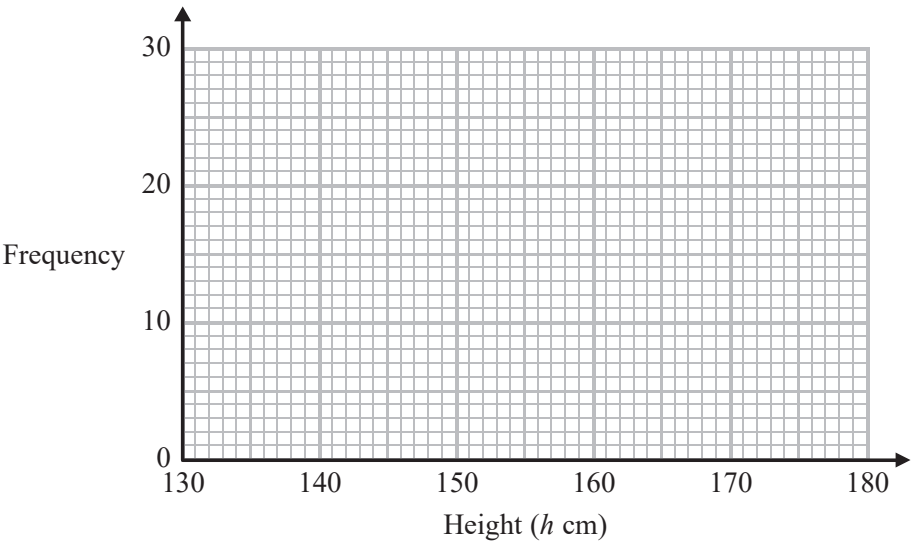
1 The table shows information about the heights of 80 children.

Height (h cm)	Frequency
$130 < h \leq 140$	4
$140 < h \leq 150$	11
$150 < h \leq 160$	24
$160 < h \leq 170$	22
$170 < h \leq 180$	19

(a) Find the class interval that contains the median.

.....
(1)

(b) Draw a frequency polygon for the information in the table.



(2)

(Total for Question 1 is 3 marks)



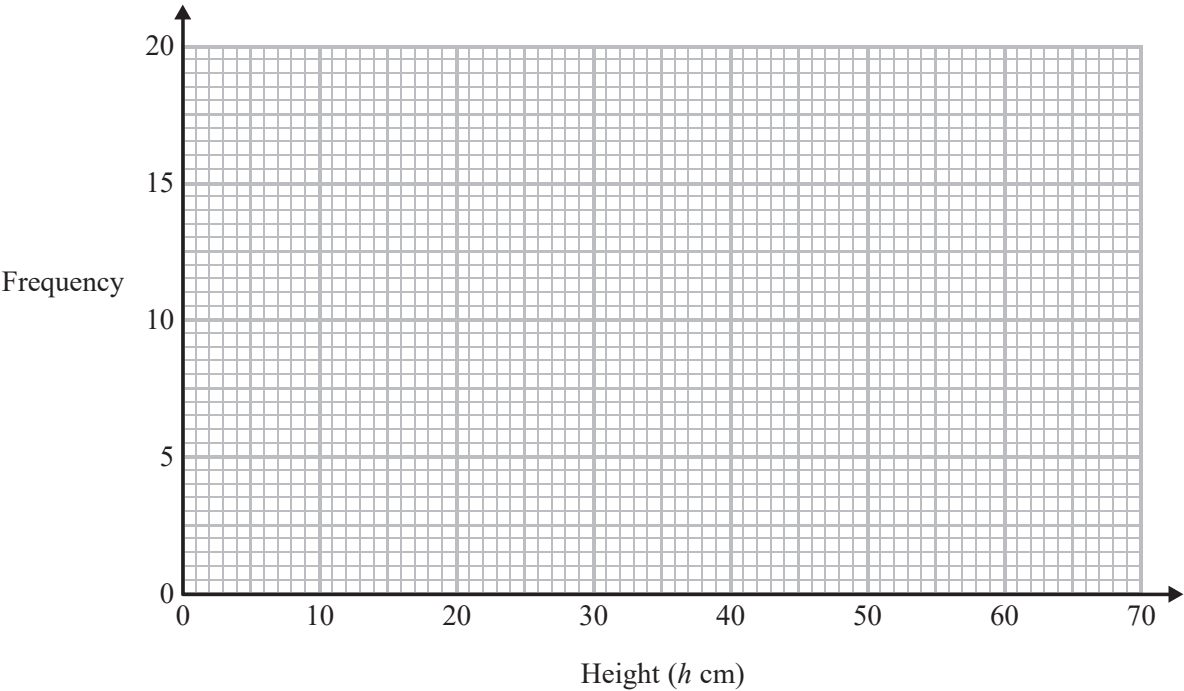
3 The table shows information about the heights of 80 plants.

Height (h cm)	Frequency
$10 < h \leq 20$	7
$20 < h \leq 30$	13
$30 < h \leq 40$	14
$40 < h \leq 50$	12
$50 < h \leq 60$	16
$60 < h \leq 70$	18

(a) Find the class interval that contains the median.

(1)

(b) On the grid, draw a frequency polygon for the information in the table.



(2)

(Total for Question 3 is 3 marks)



- 6 4 red bricks have a mean weight of 5 kg.
5 blue bricks have a mean weight of 9 kg.
1 green brick has a weight of 6 kg.

Donna says,

“The mean weight of the 10 bricks is less than 7 kg.”

Is Donna correct?

You must show how you get your answer.

(Total for Question 6 is 3 marks)



4 The table gives information about the times taken, in seconds, by 18 students to run a race.

Time (t seconds)	Frequency
$5 < t \leq 10$	1
$10 < t \leq 15$	2
$15 < t \leq 20$	7
$20 < t \leq 25$	8

Work out an estimate for the mean time.
Give your answer correct to 3 significant figures.

..... seconds

(Total for Question 4 is 3 marks)



7 There is a total of 45 boys and girls in a choir.

The mean age of the 18 boys is 16.2 years.

The mean age of the 27 girls is 16.7 years.

Calculate the mean age of all 45 boys and girls.

..... years

(Total for Question 7 is 3 marks)



8 The table shows the amount of snow, in cm, that fell each day for 30 days.

Amount of snow (s cm)	Frequency
$0 \leq s < 10$	8
$10 \leq s < 20$	10
$20 \leq s < 30$	7
$30 \leq s < 40$	2
$40 \leq s < 50$	3

Work out an estimate for the mean amount of snow per day.

..... cm

(Total for Question 8 is 3 marks)



- 7 (a) Change 8000 cm^3 to m^3

..... m^3
(1)

- (b) Change a speed of 180 km per hour to metres per second.

..... metres per second
(3)

(Total for Question 7 is 4 marks)

- 8 There are 30 women and 20 men at a gym.

The mean height of all 50 people is 167.6 cm

The mean height of the 20 men is 182 cm

Work out the mean height of the 30 women.

..... cm

(Total for Question 8 is 3 marks)



8 Len has 8 parcels.

The mean weight of the 8 parcels is 2.5 kg.

The mean weight of 3 of the parcels is 2 kg.

Work out the mean weight of the other 5 parcels.

..... kg

(Total for Question 8 is 3 marks)

9 In a sale, the normal price of a coat is reduced by $R\%$

Given that

$$\text{sale price} = 0.7 \times \text{normal price}$$

find the value of R .

$R =$

(Total for Question 9 is 1 mark)



5 The table shows information about the weekly earnings of 20 people who work in a shop.

Weekly earnings (£ x)	Frequency
$150 < x \leq 250$	1
$250 < x \leq 350$	11
$350 < x \leq 450$	5
$450 < x \leq 550$	0
$550 < x \leq 650$	3

(a) Work out an estimate for the mean of the weekly earnings.

£.....
(3)

Nadiya says,

“The mean may **not** be the best average to use to represent this information.”

(b) Do you agree with Nadiya?
You must justify your answer.

.....
.....
(1)

(Total for Question 5 is 4 marks)

- 4 The mean length of 5 sticks is 4.2 cm.

Nawal measured the length of one of the sticks as 7 cm.

- (a) Work out the mean length of the other 4 sticks.

..... cm
(3)

Nawal made a mistake.
The stick was not 7 cm long.
It was 17 cm long.

- (b) How does this affect your answer to part (a)?

.....
.....
.....
(1)

(Total for Question 4 is 4 marks)



- 3 Seija works at a weather station.
The table gives information about the temperature, T °C, at midday for each of 50 cities in the UK on Tuesday.

Temperature (T °C)	Frequency
$10 < T \leq 15$	2
$15 < T \leq 20$	8
$20 < T \leq 25$	13
$25 < T \leq 30$	21
$30 < T \leq 35$	6

- (a) Calculate an estimate for the mean temperature.

.....°C
(3)

Seija says,

“The median temperature is 22.5 °C because 22.5 is the middle number in the middle group.”

- (b) Is Seija correct?
Give a reason for your answer.

.....
.....
.....
(1)

(Total for Question 3 is 4 marks)

6 Here are two lists of numbers.

List **A** 276 400 157 139

List **B** 530 500 270 x 440 320

mean of list **A** : mean of list **B** = 3 : 5

Work out the value of x .

$x =$

(Total for Question 6 is 5 marks)



SUB-TOPIC S1c

CHARTS & DIAGRAMS

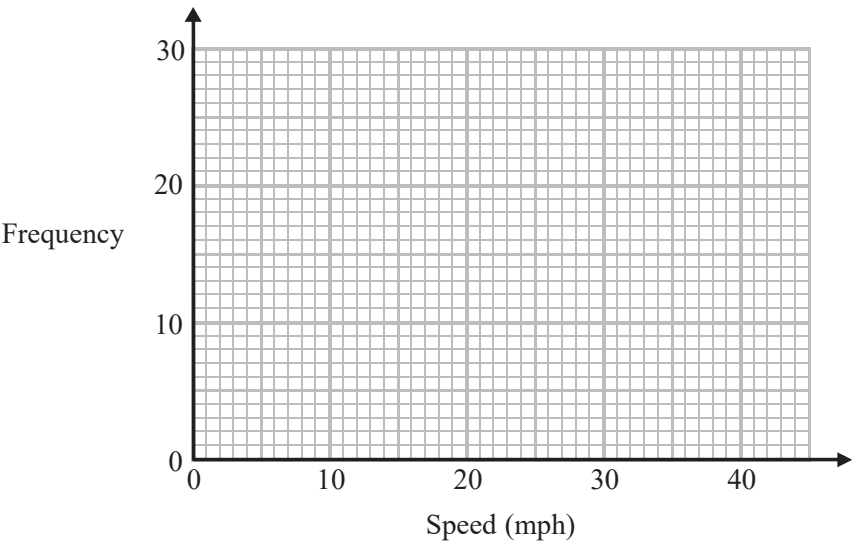
Sub-topic S1c · 11 questions · 30 marks · lowest tariff first



7 The table gives information about the speeds of 70 cars.

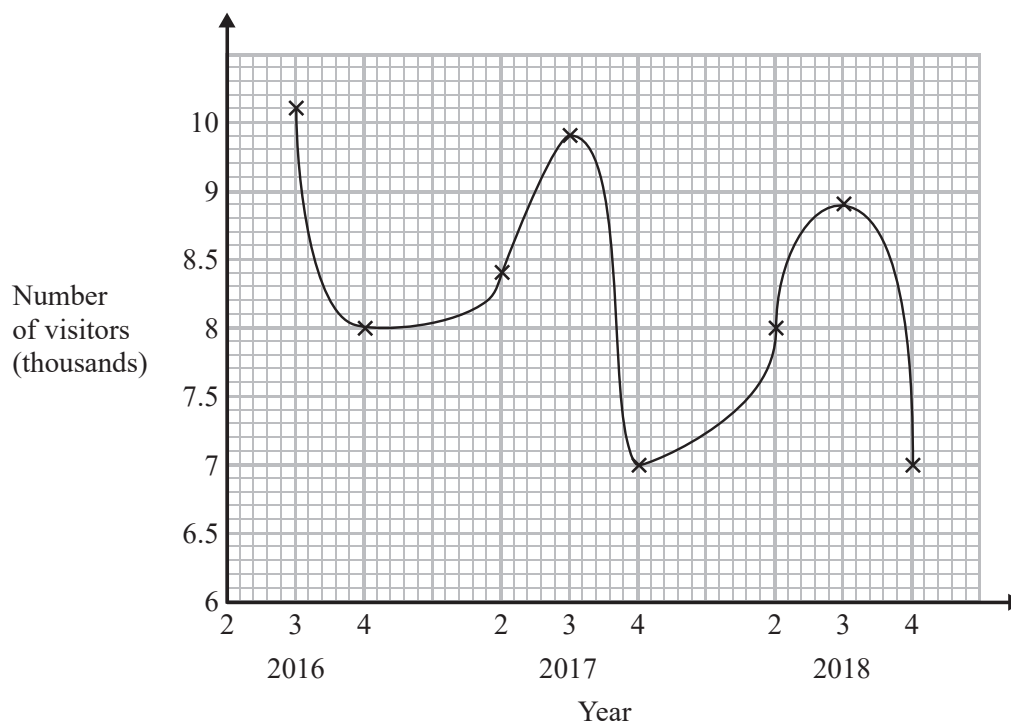
Speed (s mph)	Frequency
$0 < s \leq 10$	14
$10 < s \leq 20$	18
$20 < s \leq 30$	26
$30 < s \leq 40$	12

Draw a frequency polygon for this information.



(Total for Question 7 is 2 marks)

- 4 Sean has drawn a time series graph to show the numbers, in thousands, of visitors to a fun park.



Write down two things that are wrong or could be misleading with this graph.

1

.....

.....

2

.....

.....

(Total for Question 4 is 2 marks)

Answer ALL questions.

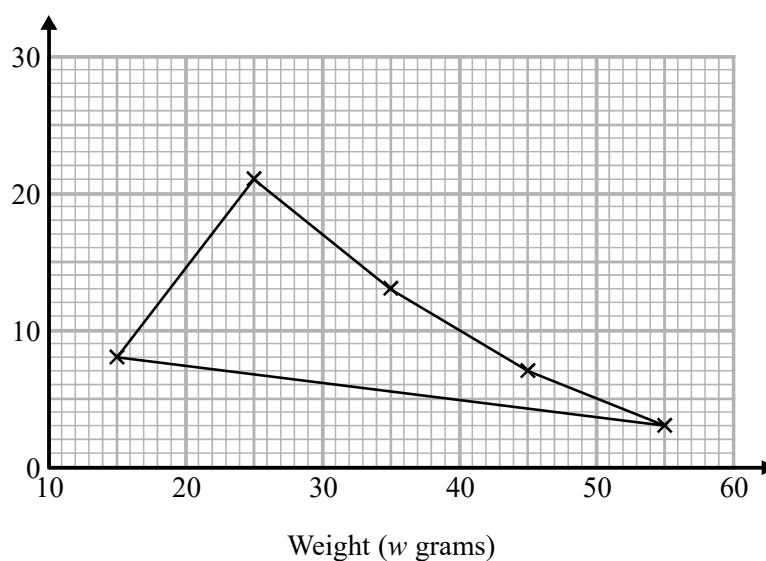
Write your answers in the spaces provided.

You must write down all the stages in your working.

- 1 The table shows some information about the weights of 50 potatoes.

Weight (w grams)	Frequency
$10 < w \leq 20$	6
$20 < w \leq 30$	21
$30 < w \leq 40$	13
$40 < w \leq 50$	7
$50 < w \leq 60$	3

Iveta drew this frequency polygon for the information in the table.
The frequency polygon is **not** fully correct.



Write down **two** things that are wrong with the frequency polygon.

- 1.....
-
- 2.....
-

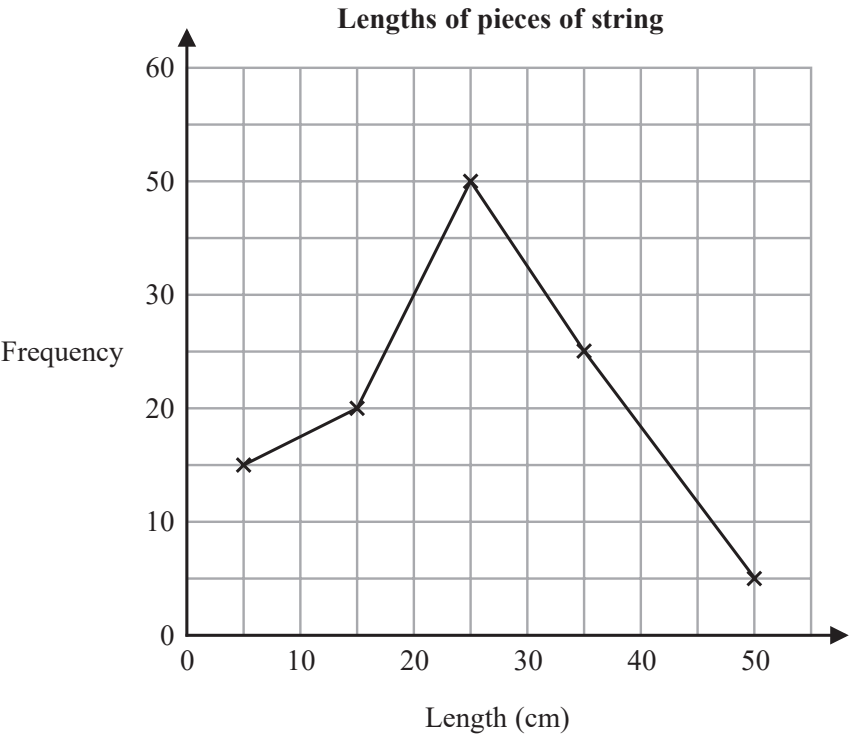
(Total for Question 1 is 2 marks)



5 The table gives information about the lengths, in cm, of some pieces of string.

Length (t cm)	Frequency
$0 < t \leq 10$	15
$10 < t \leq 20$	20
$20 < t \leq 30$	50
$30 < t \leq 40$	25
$40 < t \leq 50$	5

Amos draws a frequency polygon for the information in the table.



Write down **two** mistakes that Amos has made.

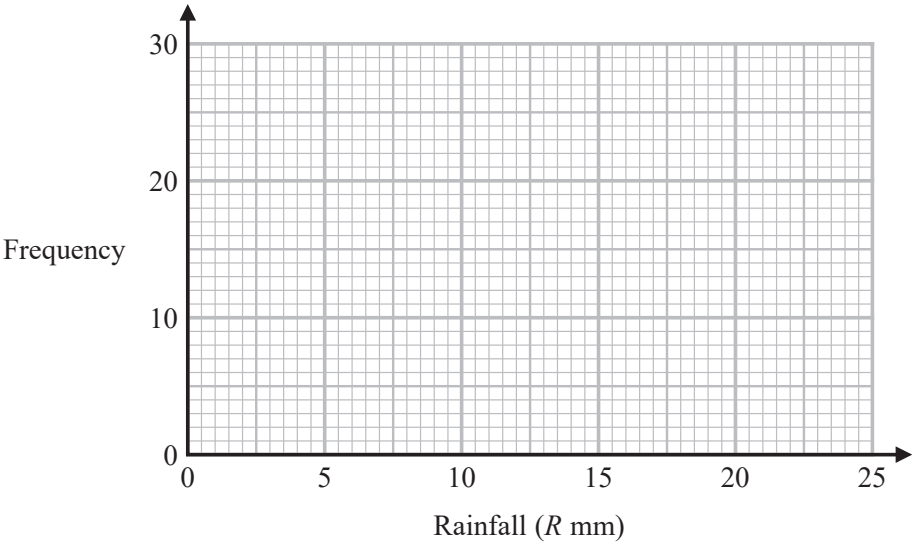
- 1.....
-
- 2.....
-

(Total for Question 5 is 2 marks)

4 The table shows information about the daily rainfall in a town for 60 days.

Rainfall (R mm)	Frequency
$0 \leq R < 5$	8
$5 \leq R < 10$	24
$10 \leq R < 15$	13
$15 \leq R < 20$	11
$20 \leq R < 25$	4

Draw a frequency polygon for this information.



(Total for Question 4 is 2 marks)



Answer ALL questions.

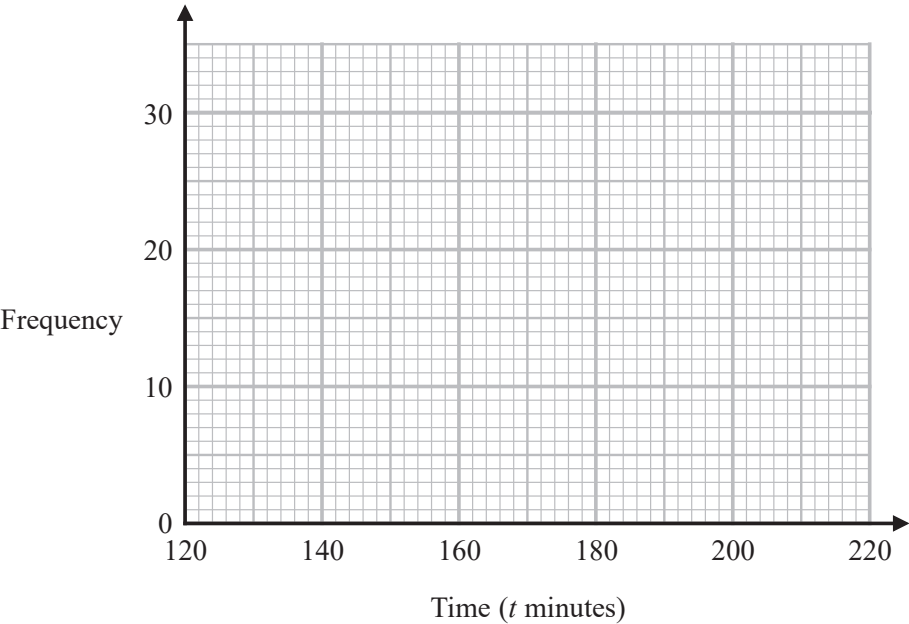
Write your answers in the spaces provided.

You must write down all the stages in your working.

- 1 The table shows information about the times, in minutes, 100 people took to complete a bike race.

Time (t minutes)	Frequency
$120 \leq t < 140$	12
$140 \leq t < 160$	28
$160 \leq t < 180$	30
$180 \leq t < 200$	22
$200 \leq t < 220$	8

On the grid below, draw a frequency polygon for this information.



(Total for Question 1 is 2 marks)



Answer ALL questions.

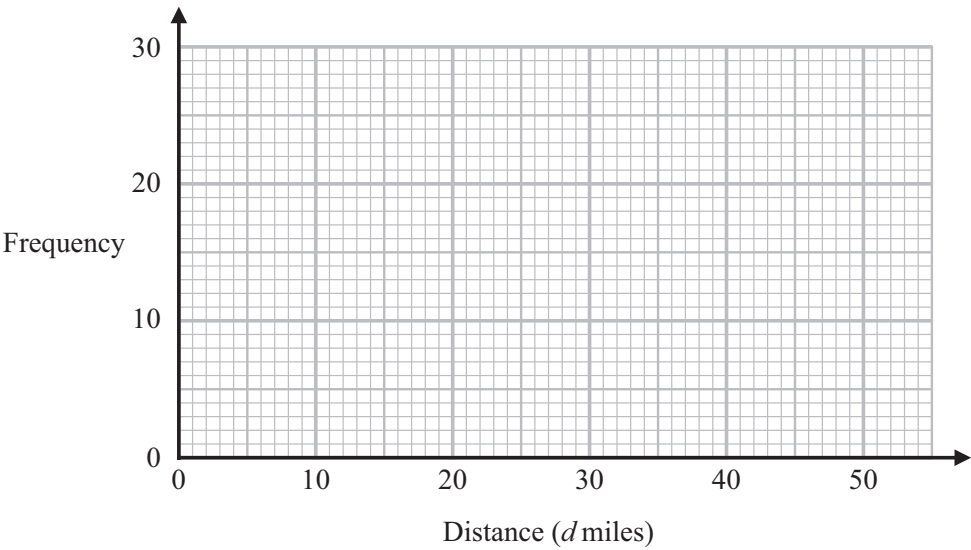
Write your answers in the spaces provided.

You must write down all the stages in your working.

1 The table shows information about the distances that 60 people travel to work.

Distance (d miles)	Frequency
$0 < d \leq 10$	12
$10 < d \leq 20$	25
$20 < d \leq 30$	10
$30 < d \leq 40$	8
$40 < d \leq 50$	5

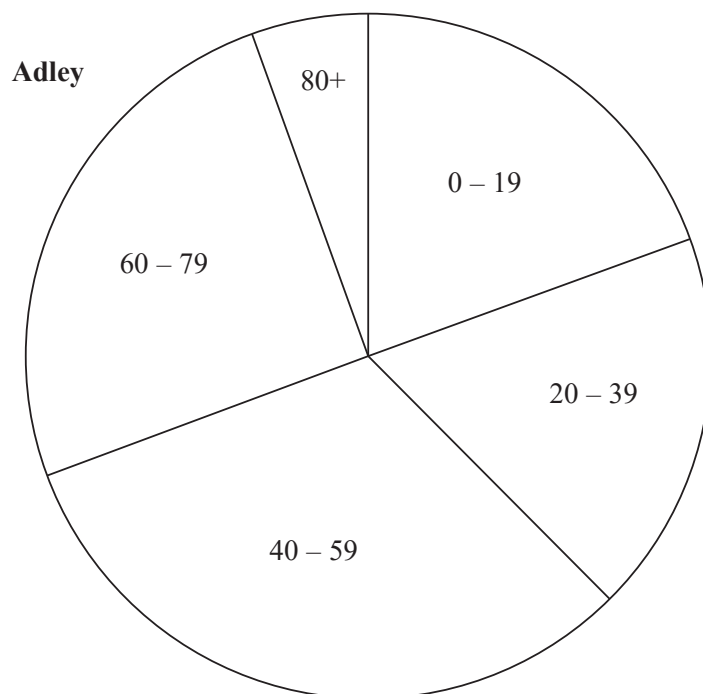
Draw a frequency polygon for the information in the table.



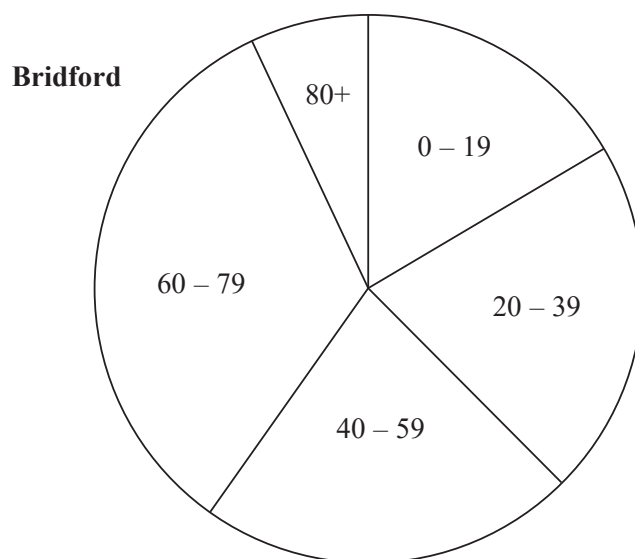
(Total for Question 1 is 2 marks)



- 11 The pie charts give information about the ages, in years, of people living in two towns, Adley and Bridford.



Diagrams
accurately
drawn



The ratio of the number of people living in Adley to the number of people living in Bridford is given by the ratio of the areas of the pie charts.

What proportion of the total number of people living in these two towns live in Adley **and** are aged 0 – 19?

Give your answer correct to 3 significant figures.

.....
(Total for Question 11 is 3 marks)



7 The table shows information about the heights, in cm, of a group of Year 9 girls.

least height	150 cm
median	165 cm
greatest height	170 cm

This stem and leaf diagram shows information about the heights, in cm, of a group of 15 Year 9 boys.

15	8 9 9
16	4 5 7 7 8
17	0 3 4 4 7
18	0 2

Key: 15 | 8 represents 158 cm

Compare the distribution of the heights of the girls with the distribution of the heights of the boys.

(Total for Question 7 is 3 marks)

6
The stem and leaf diagram shows the test scores of 23 students from School A.

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

Key:
3 | 0 represents 30

23 students from School B did the same test.

Their median score was 56

The range of their scores was 47

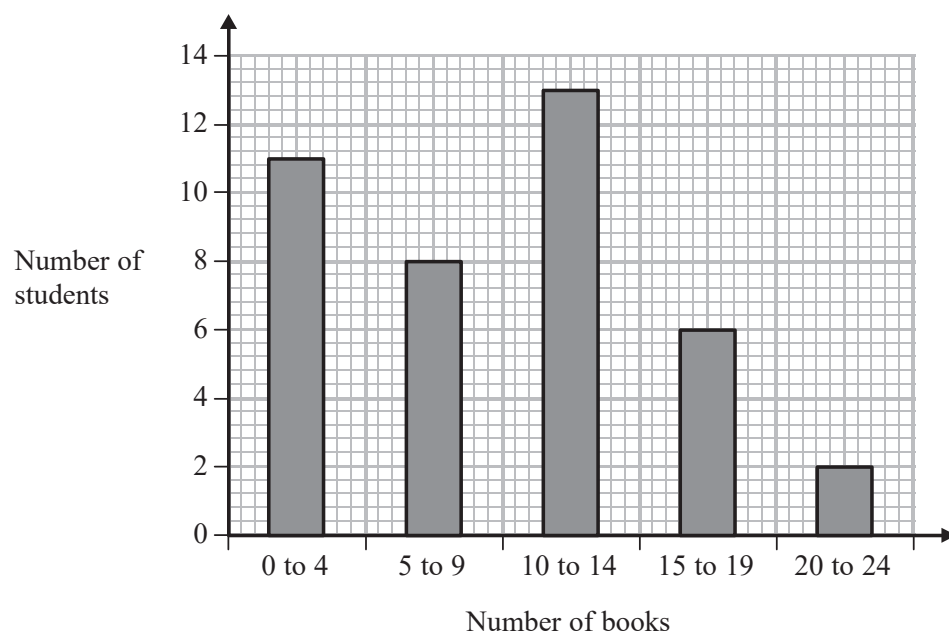
Compare the distribution of the test scores of the students from School A with the distribution of the test scores of the students from School B.

(Total for Question 6 is 4 marks)



- 4 Fran asks each of 40 students how many books they bought last year.

The chart below shows information about the number of books bought by each of the 40 students.



- (a) Work out the percentage of these students who bought 20 or more books.

..... %
(2)

- (b) Show that an estimate for the mean number of books bought is 9.5
You must show all your working.

(4)

(Total for Question 4 is 6 marks)



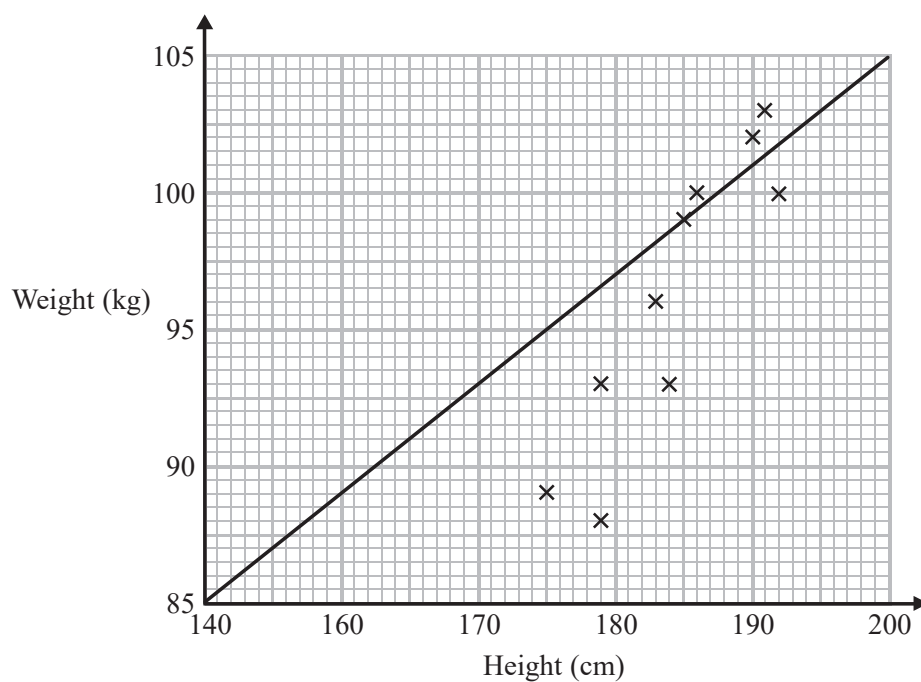
SUB-TOPIC S1d

SCATTER GRAPHS & CORRELATION

Sub-topic S1d · 8 questions · 26 marks · lowest tariff first



- 2 Sean has information about the height, in cm, and the weight, in kg, of each of ten rugby players. He is asked to draw a scatter graph and a line of best fit for this information. Here is his answer.



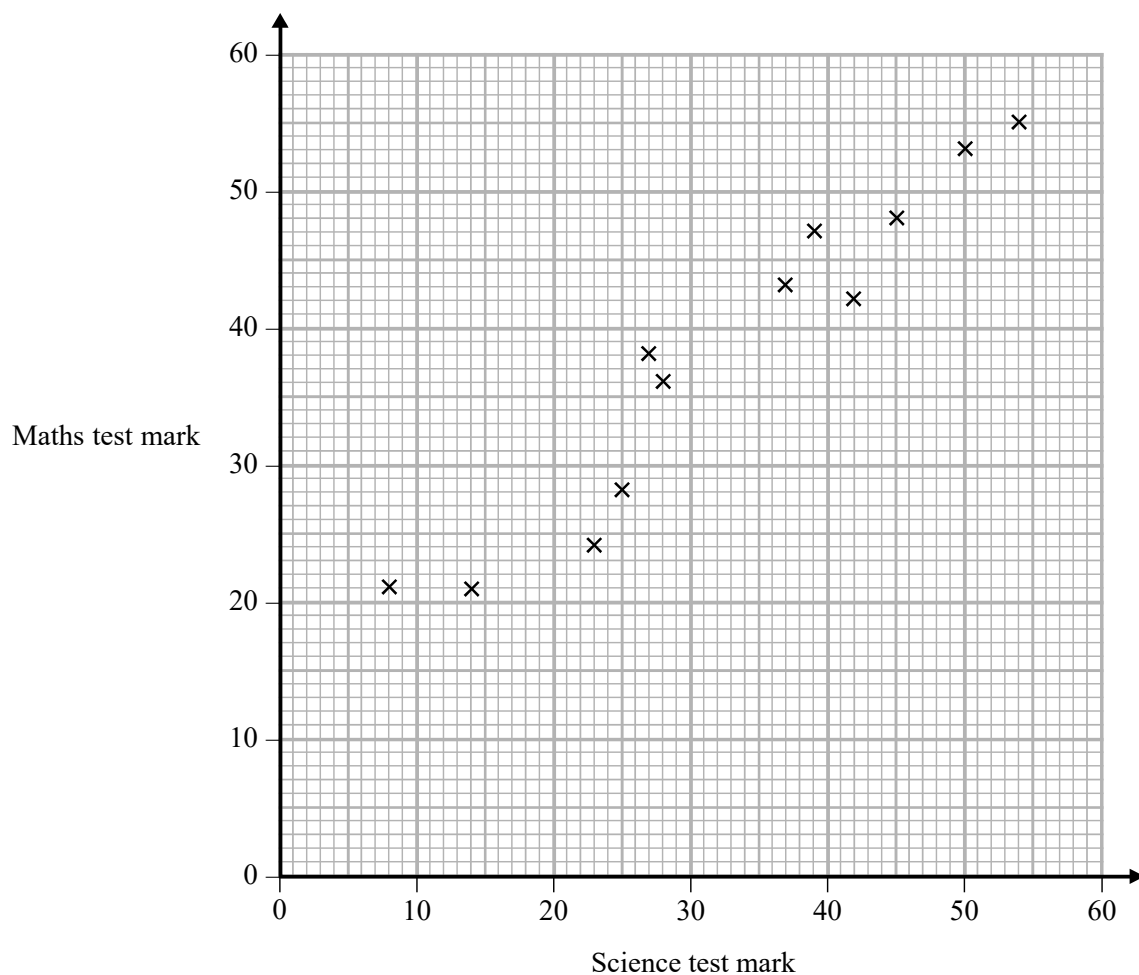
Sean has plotted the points accurately.

Write down two things that are wrong with his answer.

- 1
- 2

(Total for Question 2 is 2 marks)

- 3 The scatter graph shows information about the marks a group of students got in a Science test and in a Maths test.



Jamie got a mark of 34 in the Science test.

Using the scatter graph, find an estimate for Jamie's mark in the Maths test.

(Total for Question 3 is 2 marks)

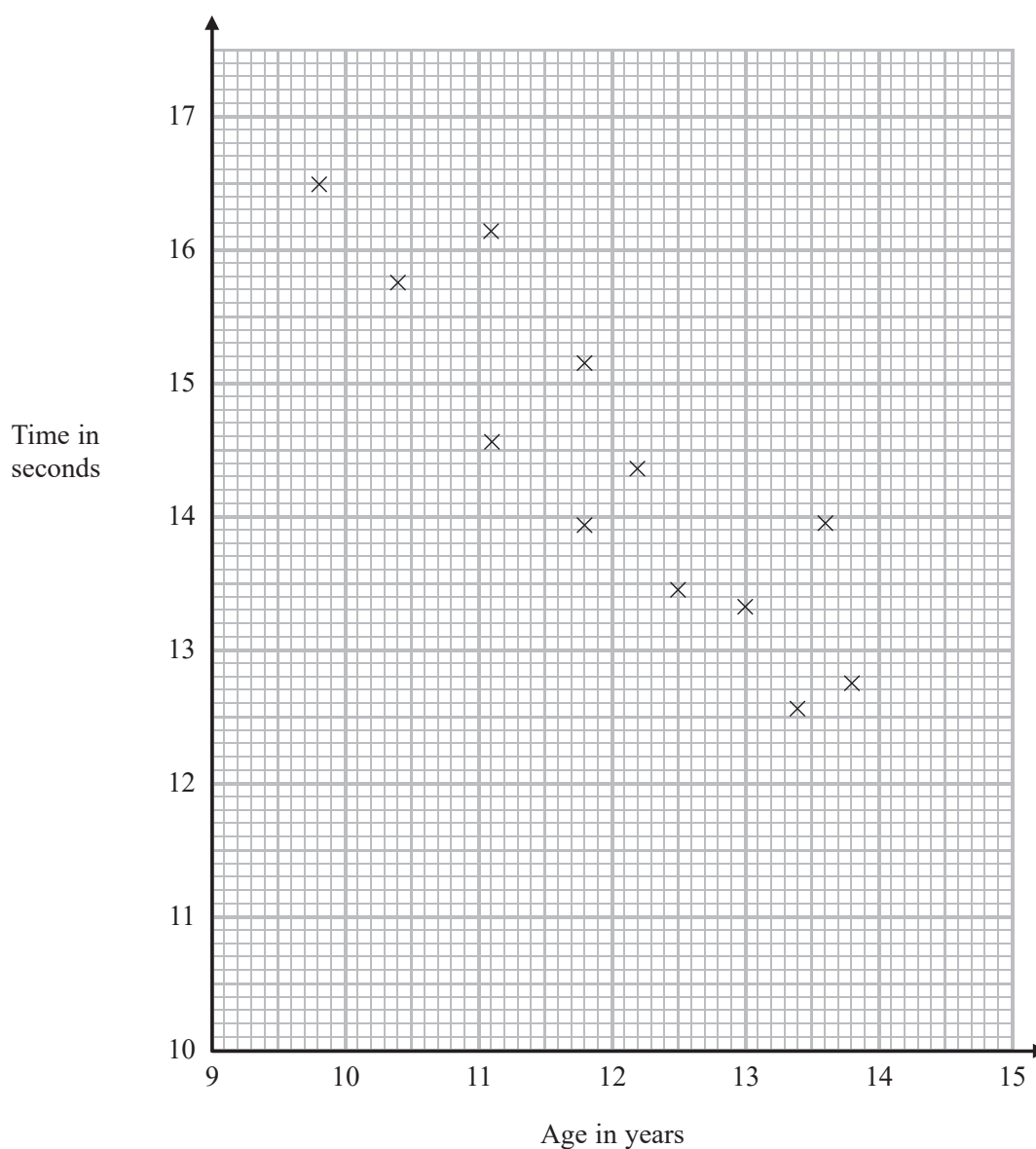
Answer ALL questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

- 1 The scatter diagram shows information about 12 girls.

It shows the age of each girl and the best time she takes to run 100 metres.



- (a) Write down the type of correlation.

(1)



Kristina is 11 years old.
Her best time to run 100 metres is 12 seconds.

The point representing this information would be an outlier on the scatter diagram.

(b) Explain why.

(1)

Debbie is 15 years old.

Debbie says,

“The scatter diagram shows I should take less than 12 seconds to run 100 metres.”

(c) Comment on what Debbie says.

(1)

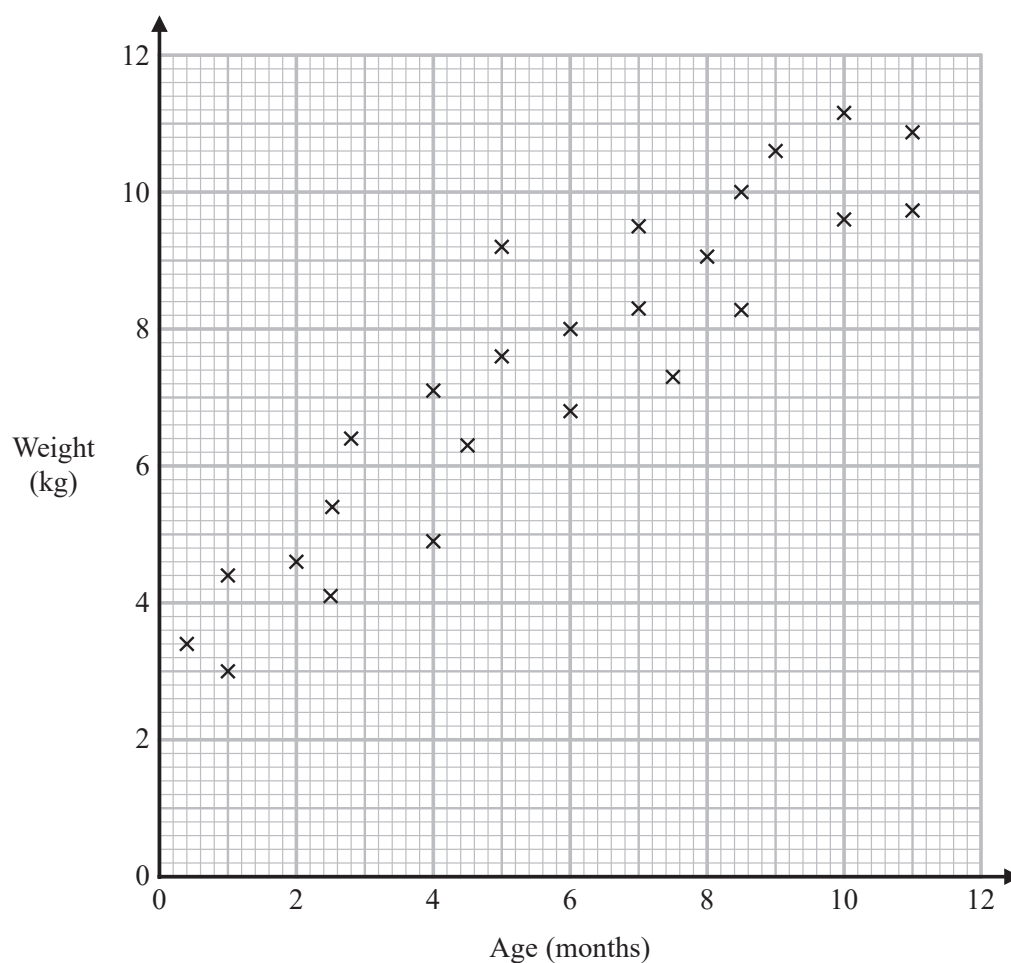
(Total for Question 1 is 3 marks)

2 Expand and simplify $5(p + 3) - 2(1 - 2p)$

(Total for Question 2 is 2 marks)



- 6 The scatter graph shows information about the ages and weights of some babies.



- (a) Describe the relationship between the age and the weight of the babies.

.....

.....

.....

(1)

Another baby has a weight of 5.8 kg

- (b) Using the scatter graph, find an estimate for the age of this baby.

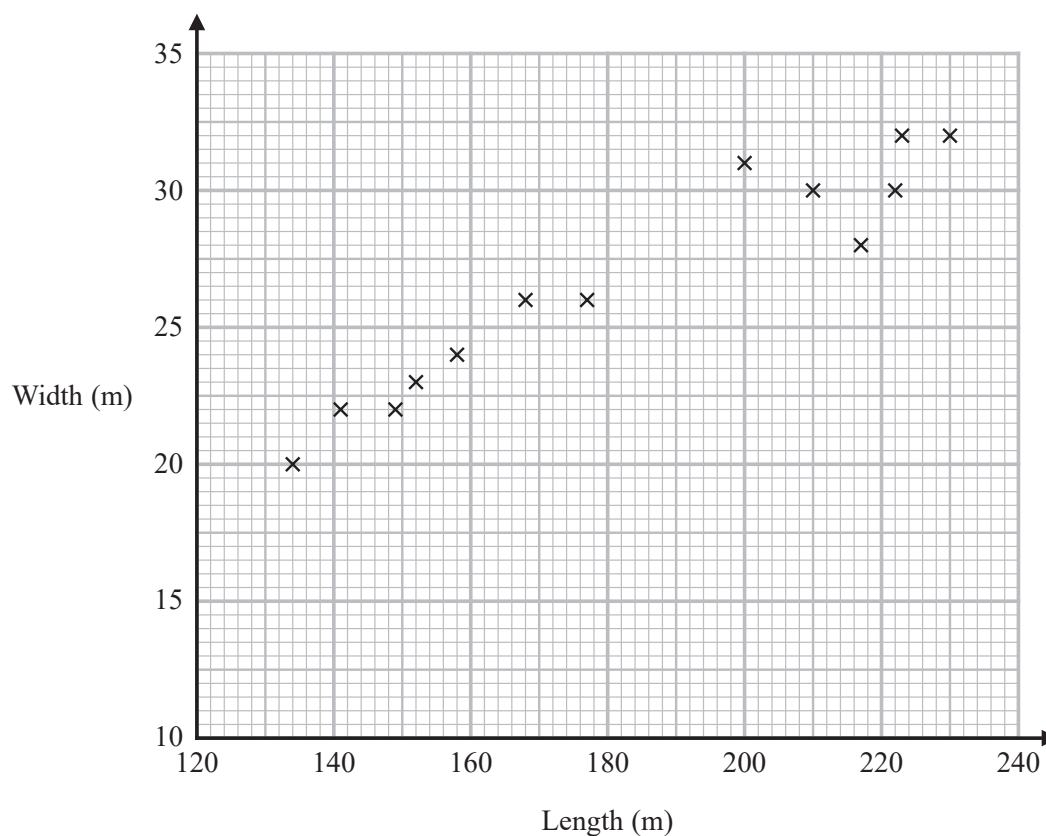
..... months

(2)

(Total for Question 6 is 3 marks)



- 2 The scatter graph shows information about some ships.
It shows the length and the width of each ship.



- (a) What type of correlation does this scatter graph show?

.....
(1)

- (b) Draw a line of best fit on the scatter graph.

(1)

A different ship has a length of 194 metres.

- (c) Use your line of best fit to find an estimate for the width of this ship.

..... metres
(1)

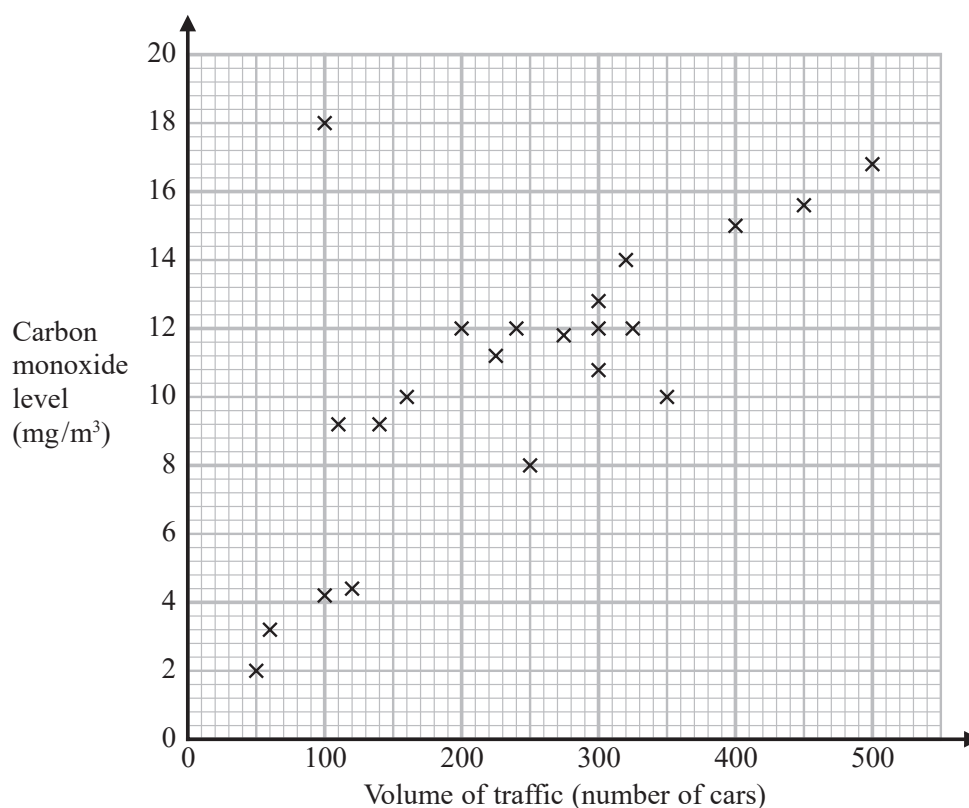
(Total for Question 2 is 3 marks)

Answer ALL questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

- 1 The scatter graph shows information about the volume of traffic and the carbon monoxide level at a point on a road each day for 22 days.



One point is an outlier.

- (a) Write down the coordinates of this point.

(....., ...)
(1)

For another day, 370 cars pass the point on the road.

- (b) Estimate the carbon monoxide level for this day.

..... mg/m³
(2)



Alfie says,
“Because there is an outlier, there is no correlation.”

- (c) Is Alfie correct?
You must give a reason for your answer.

(1)

(Total for Question 1 is 4 marks)

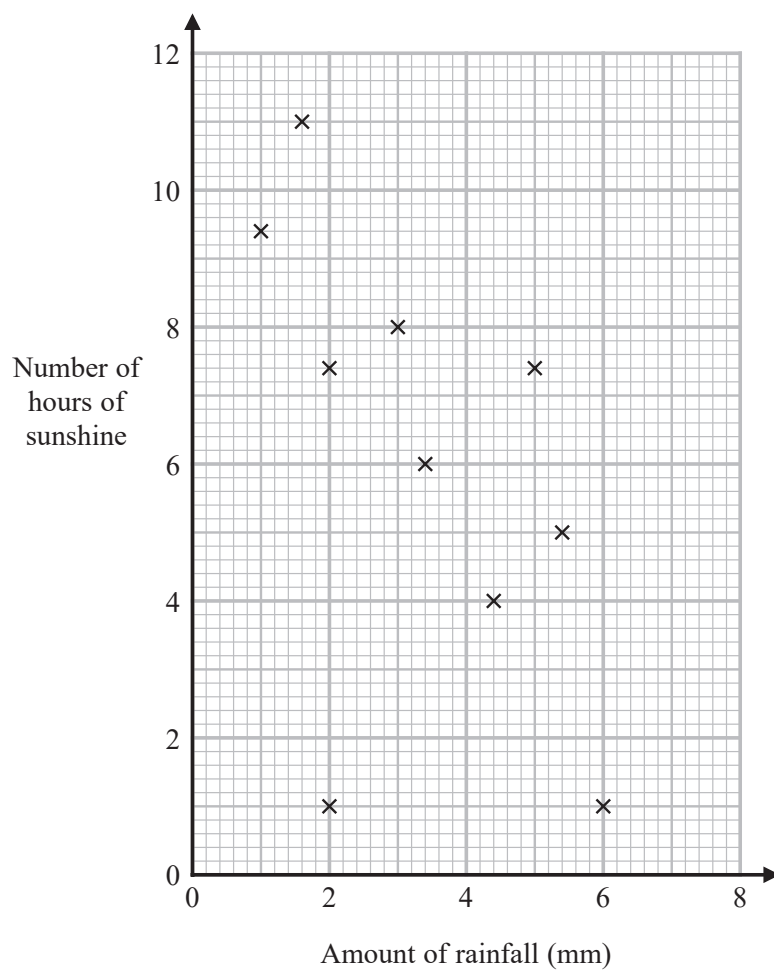


Answer ALL questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

- 1 The scatter graph shows information about the amount of rainfall, in mm, and the number of hours of sunshine for each of ten English towns on the same day.



One of the points is an outlier.

- (a) Write down the coordinates of this point.

(..... , ...)
(1)

- (b) Ignoring the outlier, describe the relationship between the amount of rainfall and the number of hours of sunshine.

.....

.....

.....

(1)

On the same day in another English town there were 7 hours of sunshine.

- (c) Using the scatter graph, estimate the amount of rainfall in this town on this day.

..... mm

(2)

(Total for Question 1 is 4 marks)

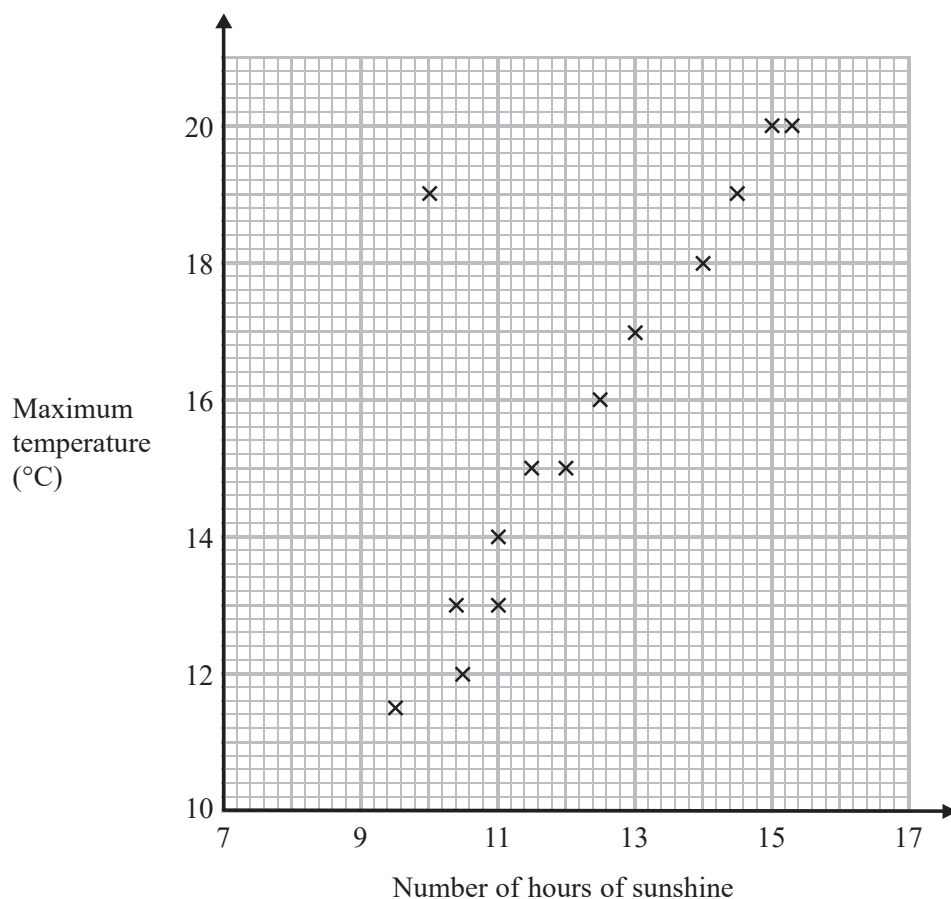


Answer ALL questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

- 1 The scatter graph shows the maximum temperature and the number of hours of sunshine in fourteen British towns on one day.



One of the points is an outlier.

- (a) Write down the coordinates of this point.

(..... , ...)
(1)

- (b) For all the other points write down the type of correlation.

.....
(1)



On the same day, in another British town, the maximum temperature was 16.4°C .

(c) Estimate the number of hours of sunshine in this town on this day.

..... hours
(2)

A weatherman says,

“Temperatures are higher on days when there is more sunshine.”

(d) Does the scatter graph support what the weatherman says?
Give a reason for your answer.

.....
.....
(1)

(Total for Question 1 is 5 marks)

2 Express 56 as the product of its prime factors.

.....
(Total for Question 2 is 2 marks)



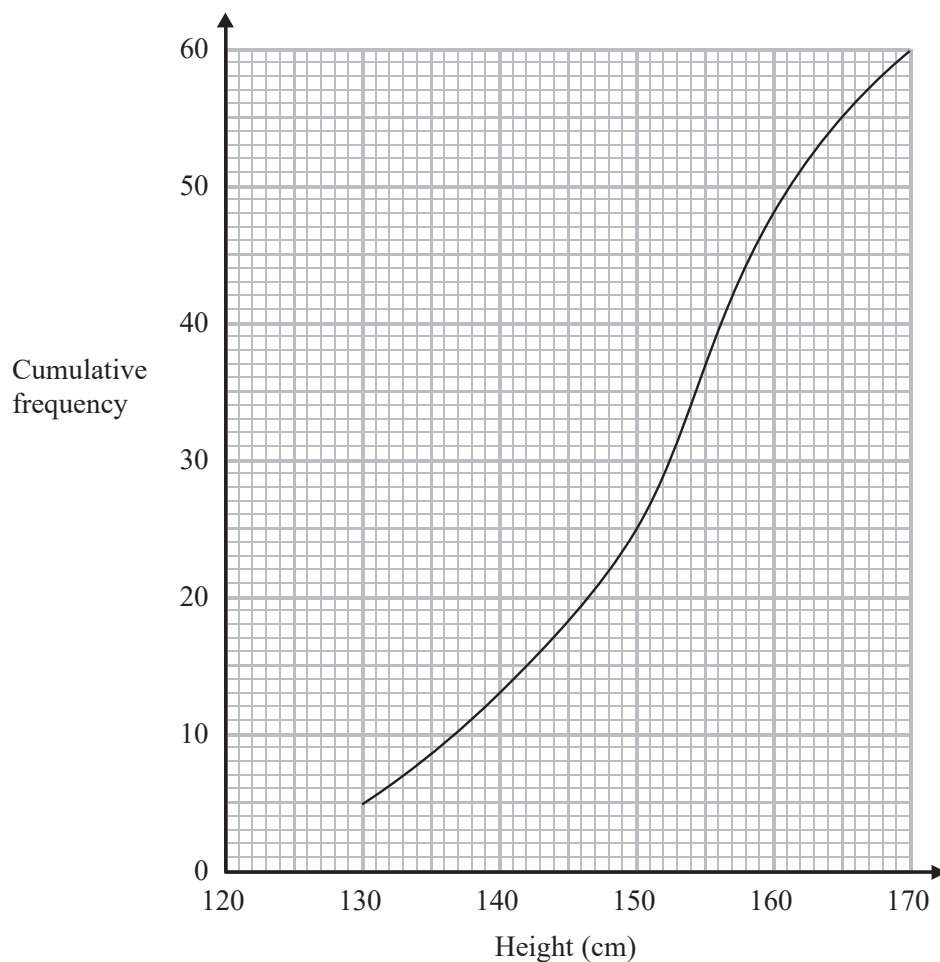
SUB-TOPIC S1e

CUMULATIVE FREQUENCY, BOX PLOTS & HISTOGRAMS

Sub-topic S1e · 42 questions · 185 marks · lowest tariff first



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



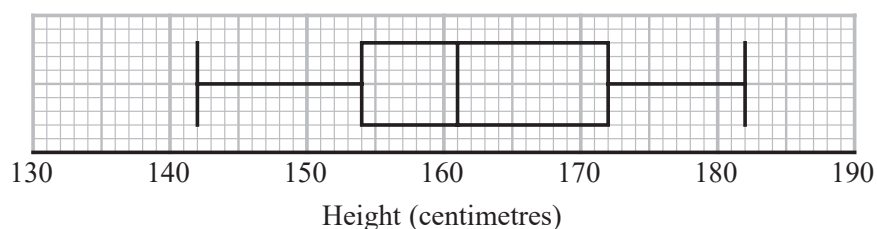
Work out an estimate for the number of these students with a height greater than 160 cm.

(Total for Question 8 is 2 marks)

- 9 Aisha recorded the heights, in centimetres, of some girls.
She used her results to work out the information in this table.

Least height	142 cm
Lower quartile	154 cm
Interquartile range	17 cm
Median	162 cm
Range	40 cm

Aisha drew this box plot for the information in the table.
The box plot is **not** fully correct.



Write down the two things Aisha should do to make the box plot fully correct.

1.....

.....

.....

2.....

.....

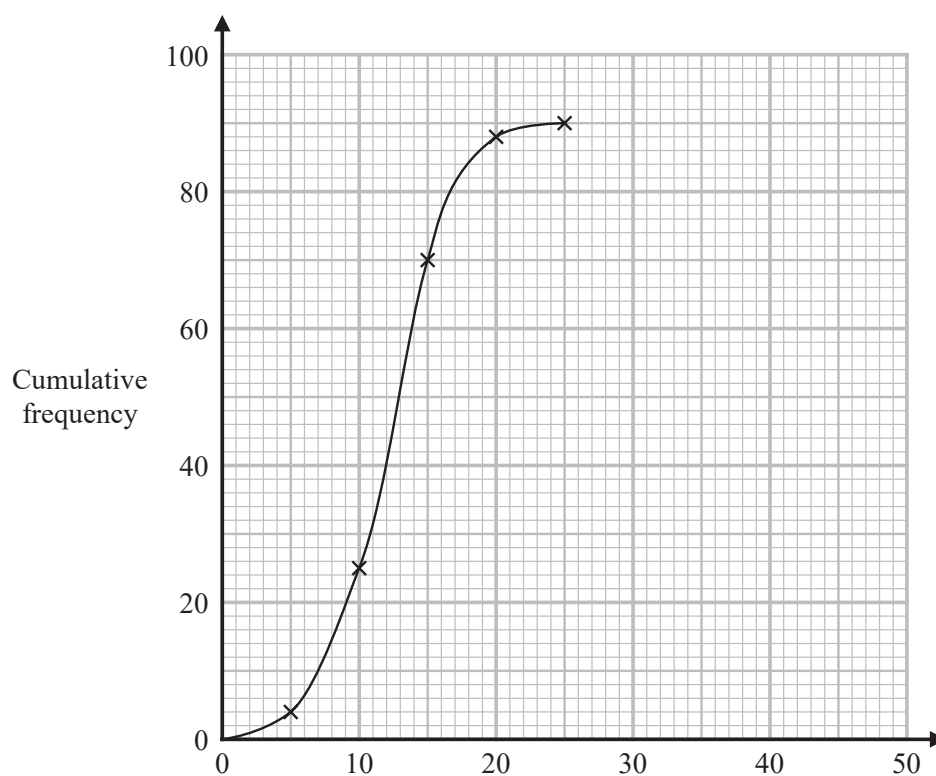
.....

(Total for Question 9 is 2 marks)

- 13 Chen has this information about the time that it took an operator at a call centre to answer each of 90 calls.

Time (t seconds)	Cumulative frequency
$0 < t \leq 10$	4
$0 < t \leq 20$	25
$0 < t \leq 30$	70
$0 < t \leq 40$	88
$0 < t \leq 50$	90

Chen draws this cumulative frequency graph for the information in the table.



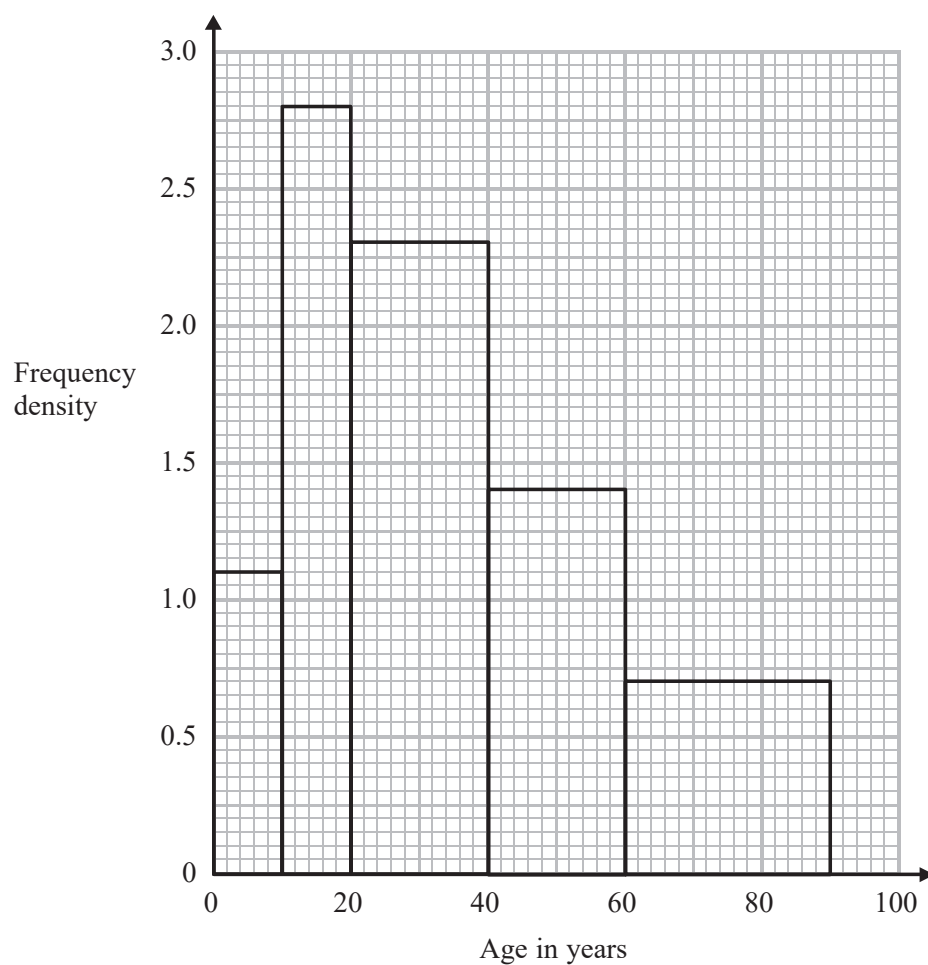
Write down two different things that are wrong with this graph.

- 1.....
- 2.....

(Total for Question 13 is 2 marks)



13 The histogram shows some information about the ages of the 134 members of a sports club.



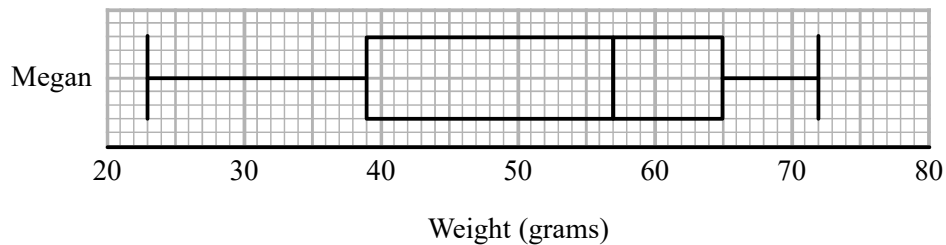
20% of the members of the sports club who are over 50 years of age are female.

Work out an estimate for the number of female members who are over 50 years of age.

(Total for Question 13 is 3 marks)

11 Megan grows potatoes.

The box plot below shows information about the weights of Megan's potatoes.



Megan says that half of her potatoes weigh less than 50 grams each.

- (a) Is Megan correct?
Give a reason for your answer.

.....

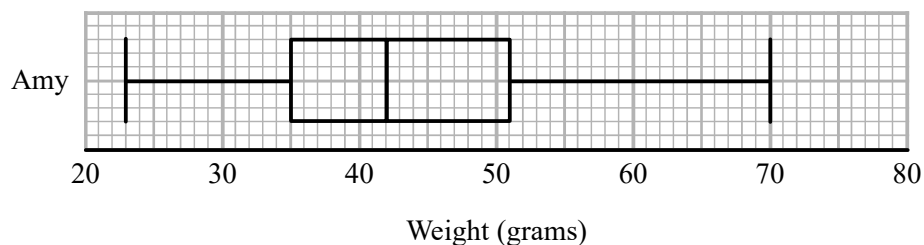
.....

.....

(1)

Amy also grows potatoes.

The box plot below shows information about the weights of Amy's potatoes.



- (b) Compare the distribution of the weights of Megan's potatoes with the distribution of the weights of Amy's potatoes.

.....

.....

.....

.....

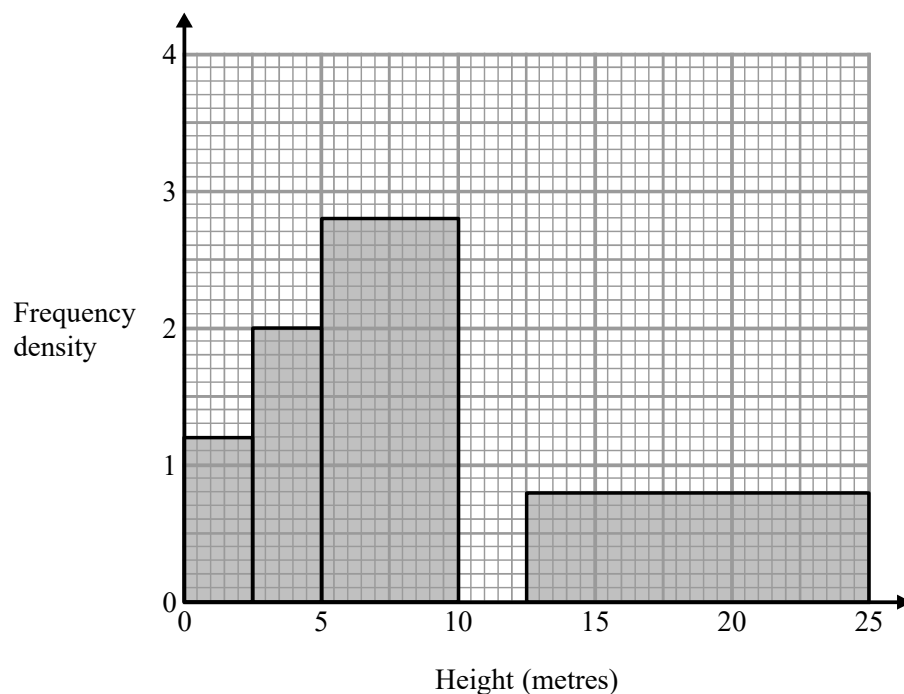
.....

(2)

(Total for Question 11 is 3 marks)



- 18 The histogram gives information about the heights, in metres, of the trees in a park. The histogram is incomplete.



20% of the trees in the park have a height between 10 metres and 12.5 metres.
None of the trees in the park have a height greater than 25 metres.

Complete the histogram.

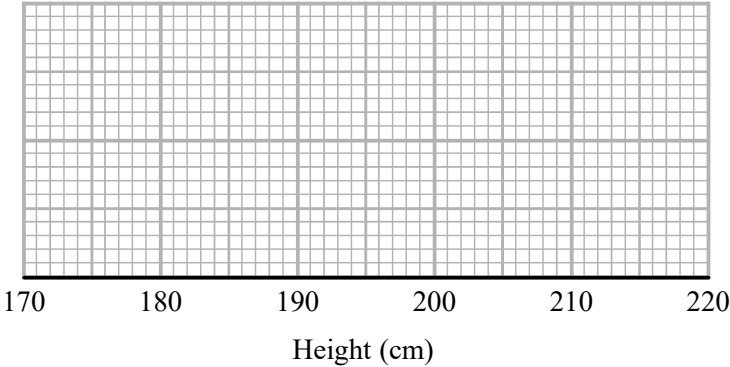
(Total for Question 18 is 3 marks)

12 The stem and leaf diagram shows information about the heights, in cm, of 23 sunflowers.

17	3	4	9				
18	6	8	8				
19	0	0	1	4	6	7	8
20	1	4	7	7	9	9	
21	4	8	8	9			

Key: 17|3 represents 173 cm

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



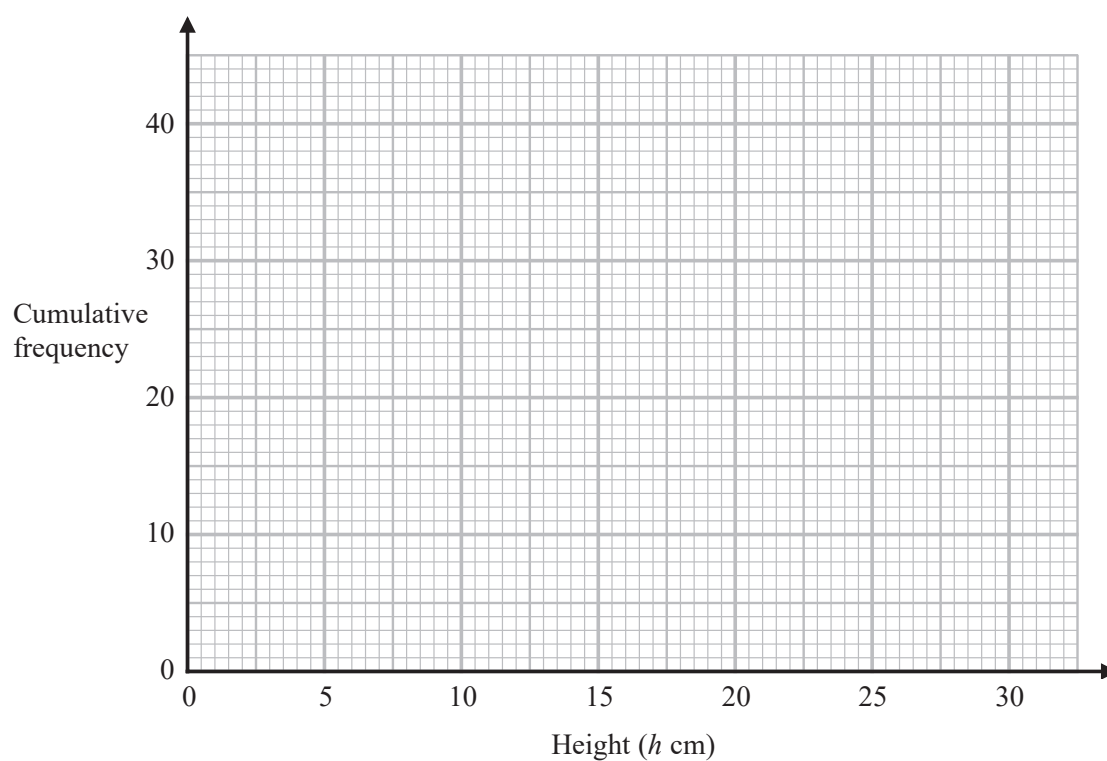
(Total for Question 12 is 3 marks)



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

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

..... cm

(1)

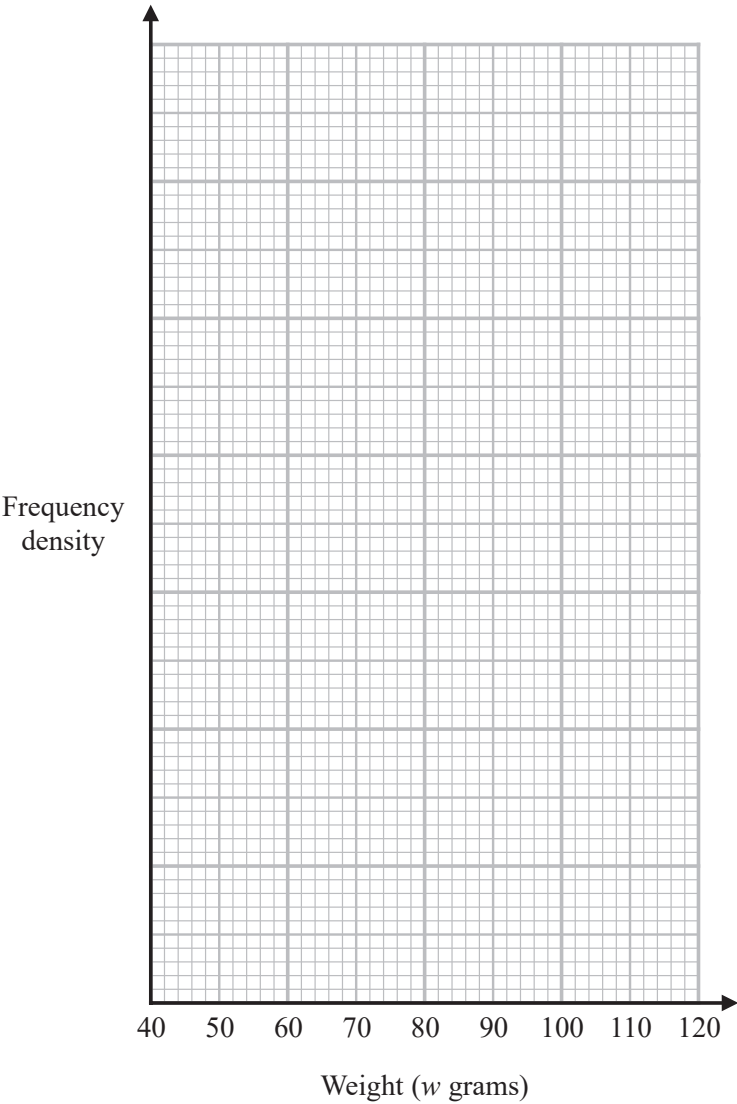
(Total for Question 12 is 3 marks)



14 The table shows information about the weights, in grams, of some potatoes.

Weight (w grams)	Number of potatoes
$50 < w \leq 70$	20
$70 < w \leq 80$	50
$80 < w \leq 90$	60
$90 < w \leq 110$	30

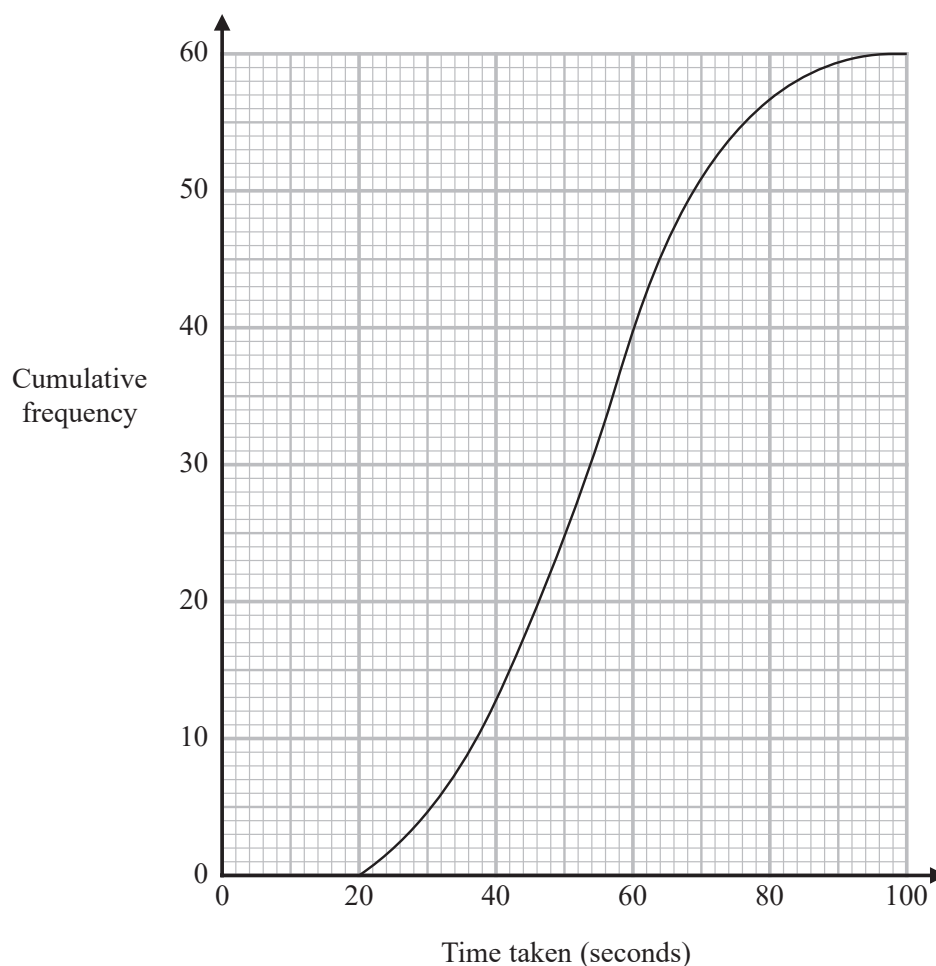
On the grid, draw a histogram for this information.



(Total for Question 14 is 3 marks)

11 In an experiment, 60 students each completed a puzzle.

The cumulative frequency graph shows information about the times taken for the 60 students to complete the puzzle.

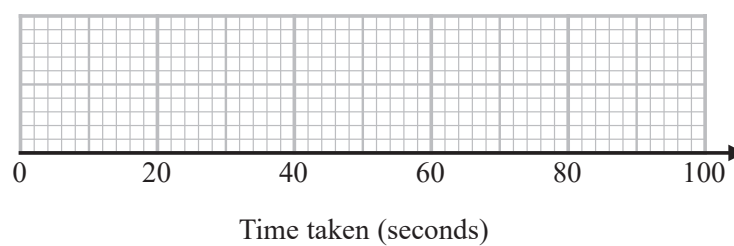


For these 60 students,

the least time taken was 24 seconds

the greatest time taken was 96 seconds.

On the grid below, draw a box plot for the distribution of the times taken by the students.



(Total for Question 11 is 3 marks)

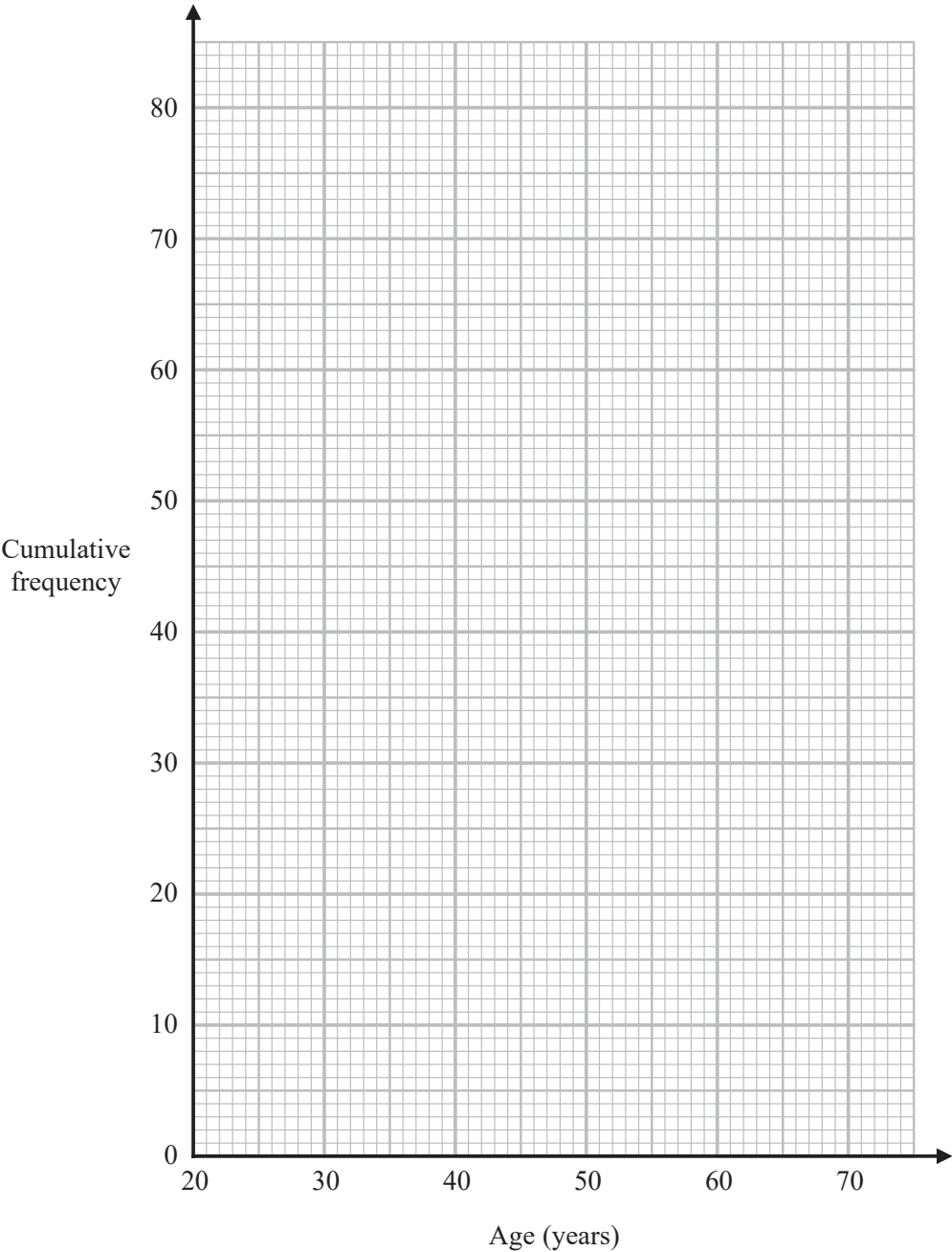
9 The cumulative frequency table gives information about the ages of 80 people working for a company.

Age (a years)	Cumulative frequency
$20 < a \leq 30$	20
$20 < a \leq 40$	48
$20 < a \leq 50$	64
$20 < a \leq 60$	75
$20 < a \leq 70$	80

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

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

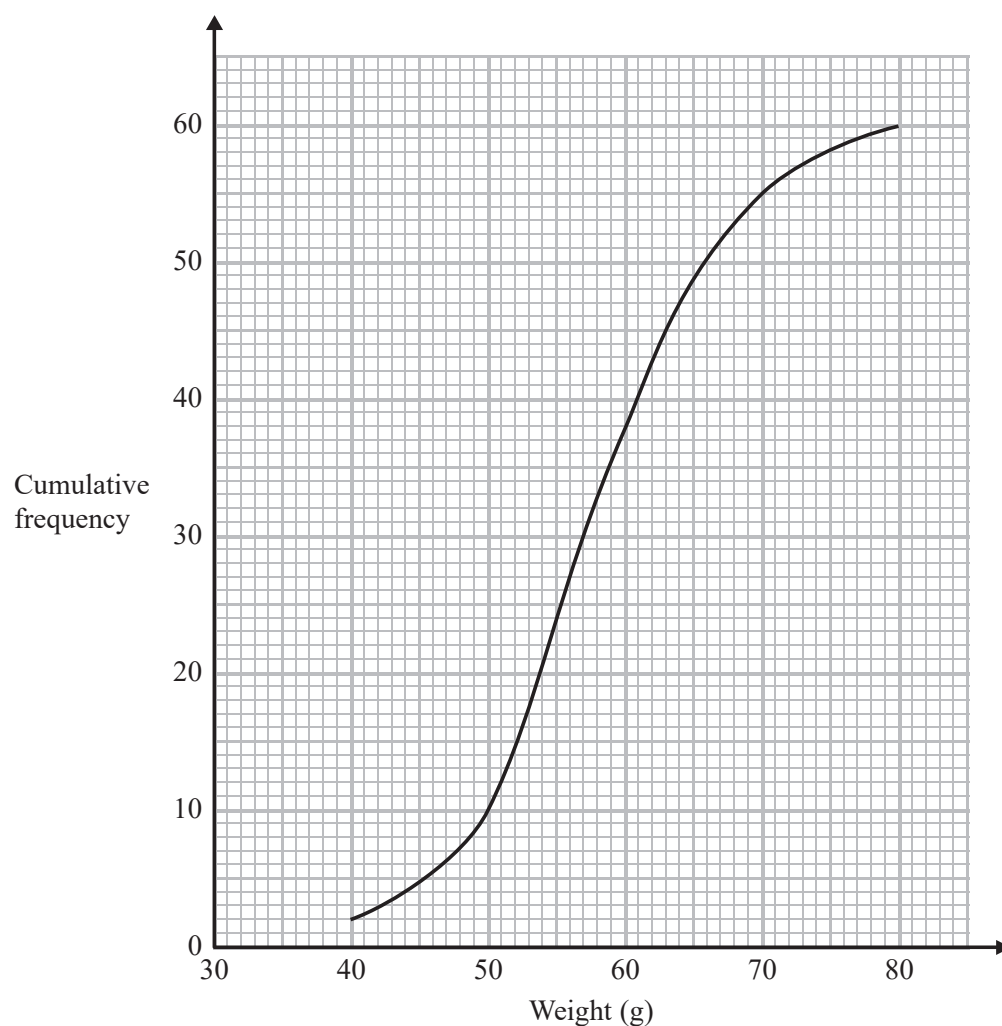
..... years (1)



(Total for Question 9 is 3 marks)



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.

..... 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.

.....
.....
(1)



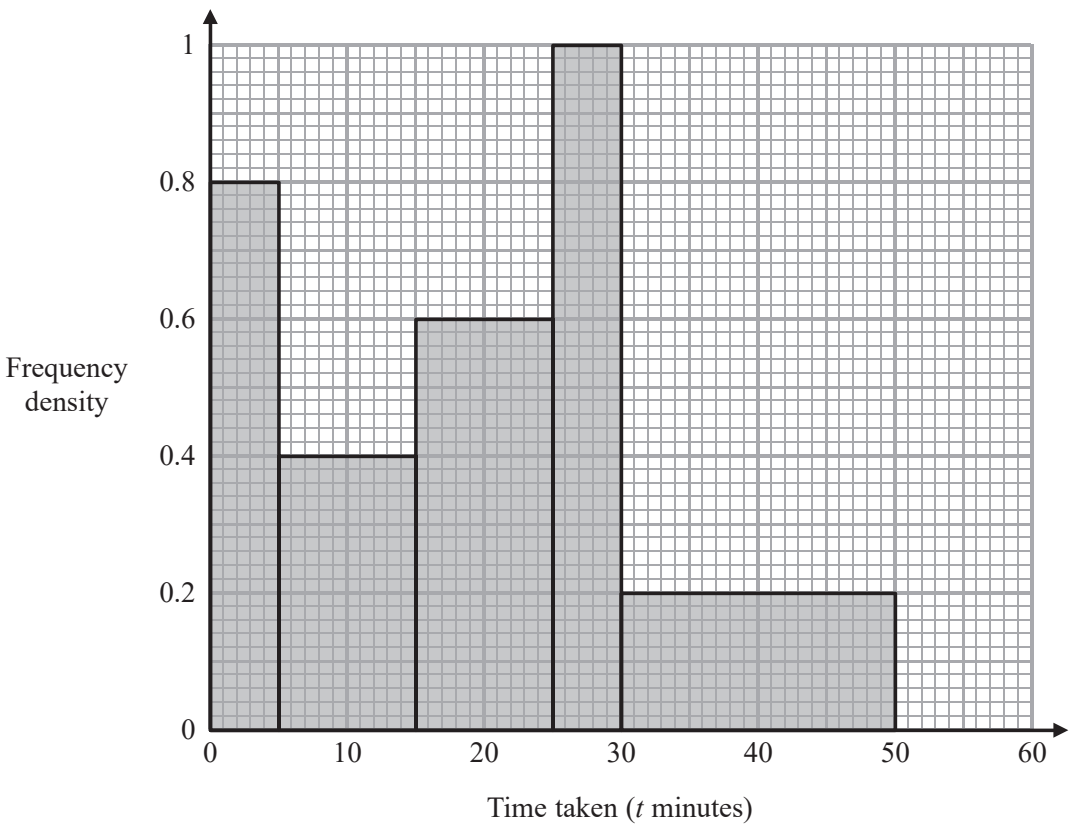
(c) Show that less than 25% of the potatoes have a weight greater than 65 g.

(2)

(Total for Question 11 is 4 marks)



17 The histogram shows information about the times taken by some students to finish a puzzle.



(a) Complete the frequency table for this information.

Time taken (t minutes)	Frequency
$0 < t \leq 5$	4
$5 < t \leq 15$	
$15 < t \leq 25$	
$25 < t \leq 30$	
$30 < t \leq 50$	

(2)



(b) Find an estimate for the lower quartile of the times taken to finish the puzzle.

..... minutes
(2)

(Total for Question 17 is 4 marks)



11 A bus company recorded the ages, in years, of the people on coach A and the people on coach B.

Here are the ages of the 23 people on coach A.

41 42 44 48 52 53 53 53 56 57 57 59
60 61 63 64 64 66 67 69 74 77 79

(a) Complete the table below to show information about the ages of the people on coach A.

Median	
Lower quartile	
Upper quartile	
Least age	41
Greatest age	79

(2)

Here is some information about the ages of the people on coach B.

Median	70
Lower quartile	54
Upper quartile	73
Least age	42
Greatest age	85

Richard says that the people on coach A are younger than the people on coach B.

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

(1)



Richard says that the people on coach A vary more in age than the people on coach B.

(c) Is Richard correct?

You must give a reason for your answer.

.....

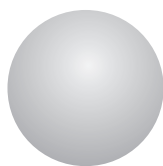
.....

.....

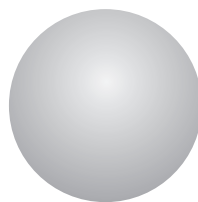
(1)

(Total for Question 11 is 4 marks)

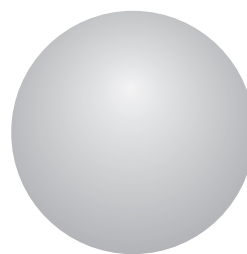
12 Here are three spheres.



P



Q



R

The volume of sphere **Q** is 50% more than the volume of sphere **P**.

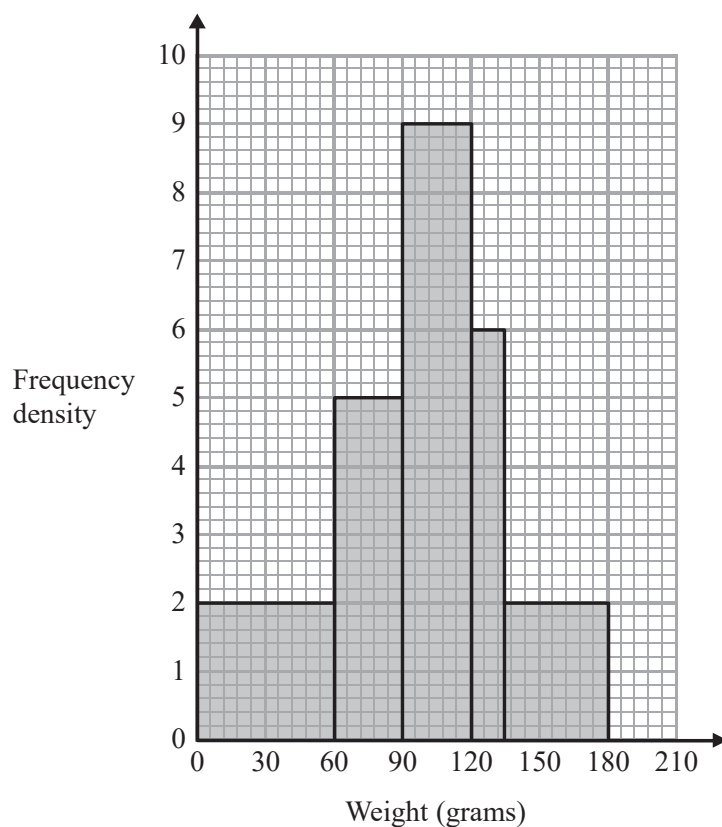
The volume of sphere **R** is 50% more than the volume of sphere **Q**.

Find the volume of sphere **P** as a fraction of the volume of sphere **R**.

.....

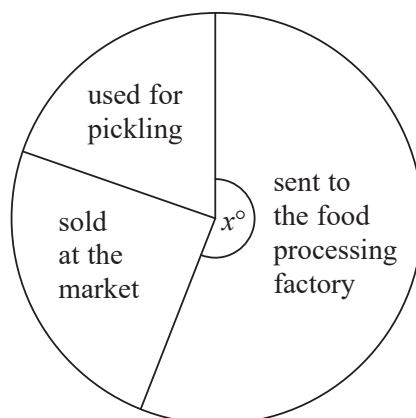
(Total for Question 12 is 3 marks)

- 21 The histogram gives information about the distribution of the weights of some onions grown by a farmer.



Onions less than 60 grams in weight are used for pickling.
Onions greater than 120 grams in weight are sold at the market.
The rest of the onions are sent to a food processing factory.

A pie chart is drawn using the information opposite to show what the farmer does with the onions he grows.



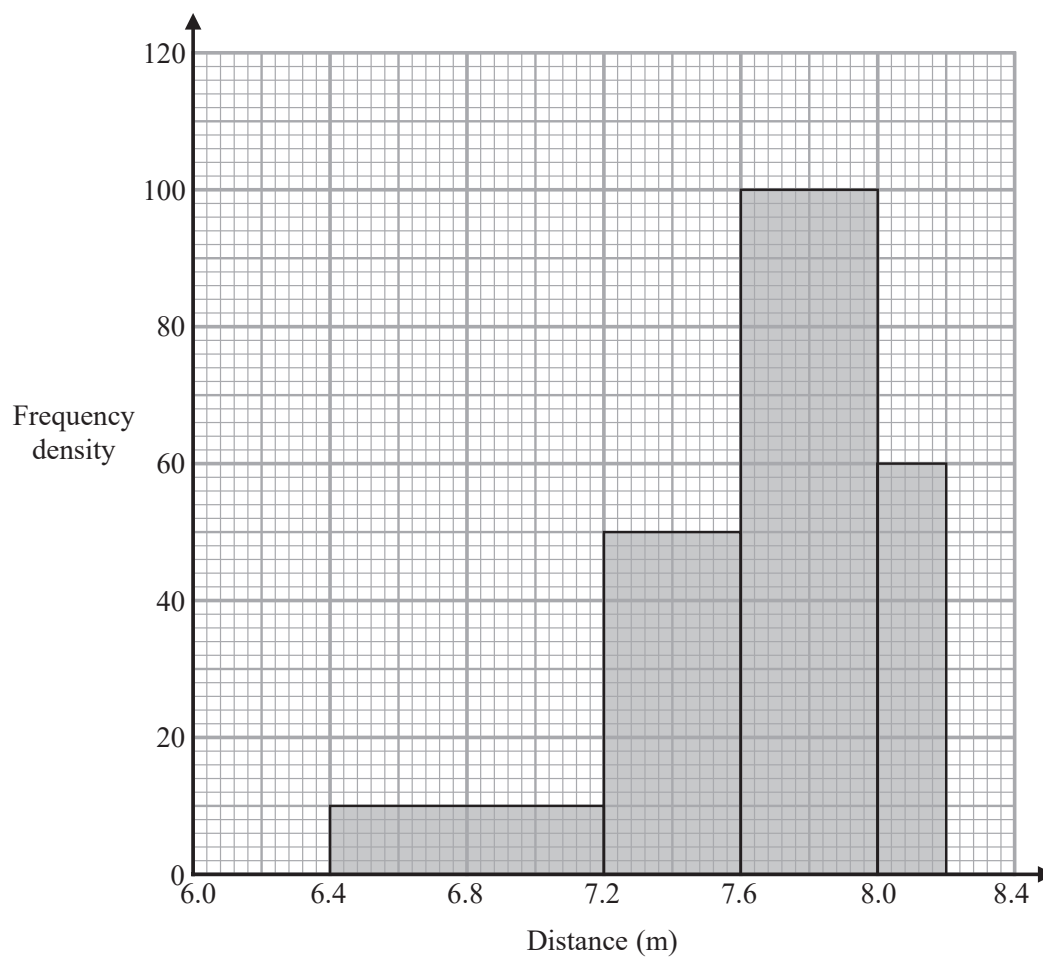
The angle of the sector for the onions sent to the food processing factory is x° .

Work out the value of x .

$x = \dots\dots\dots$

(Total for Question 21 is 4 marks)

- 17 The histogram gives information about the distances 80 competitors jumped in a long jump competition.

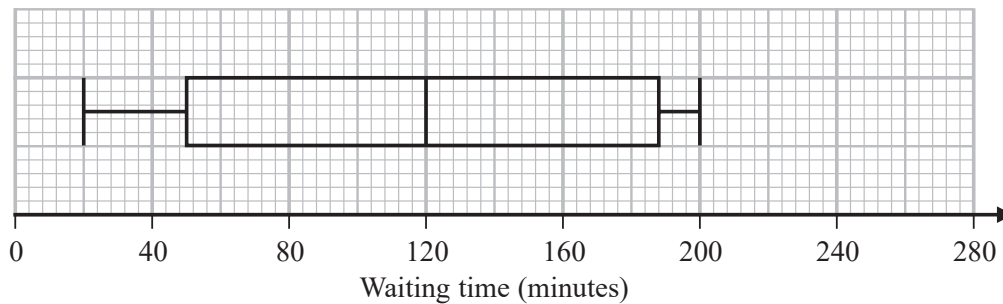


Calculate an estimate for the mean distance.

..... m

(Total for Question 17 is 4 marks)

- 9 The box plot shows information about the length of time, in minutes, some people waited to see a doctor at a hospital on Monday.



- (a) Work out the interquartile range of the information in the box plot.

..... minutes
(2)

Becky says,
“50% of the people waited for at least 2 hours.”

- (b) Is Becky correct?
Explain why.

.....
.....
.....
(1)

The table gives information about the length of time, in minutes, some people waited to see a doctor at the same hospital on Tuesday.

	Waiting time (minutes)
Shortest time	20
Lower quartile	50
Median	100
Upper quartile	140
Longest time	210

Becky was asked to compare the distribution of the lengths of times people waited on Monday with the distribution of the lengths of times people waited on Tuesday.

She wrote,

“People had to wait longer on Tuesday than on Monday.”

(c) Give **one** reason why Becky may be wrong.

.....

.....

.....

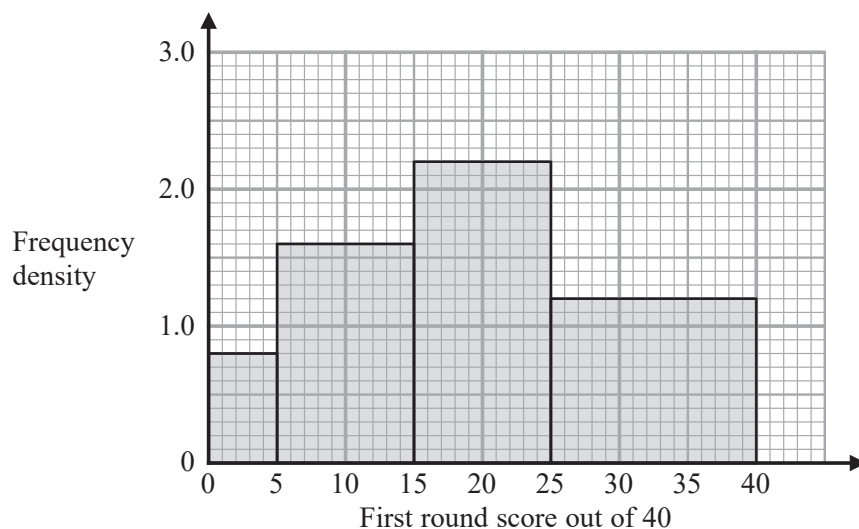
(1)

(Total for Question 9 is 4 marks)



17 Some people took part in the first round of a competition.

The histogram gives information about the scores of these people in the first round.



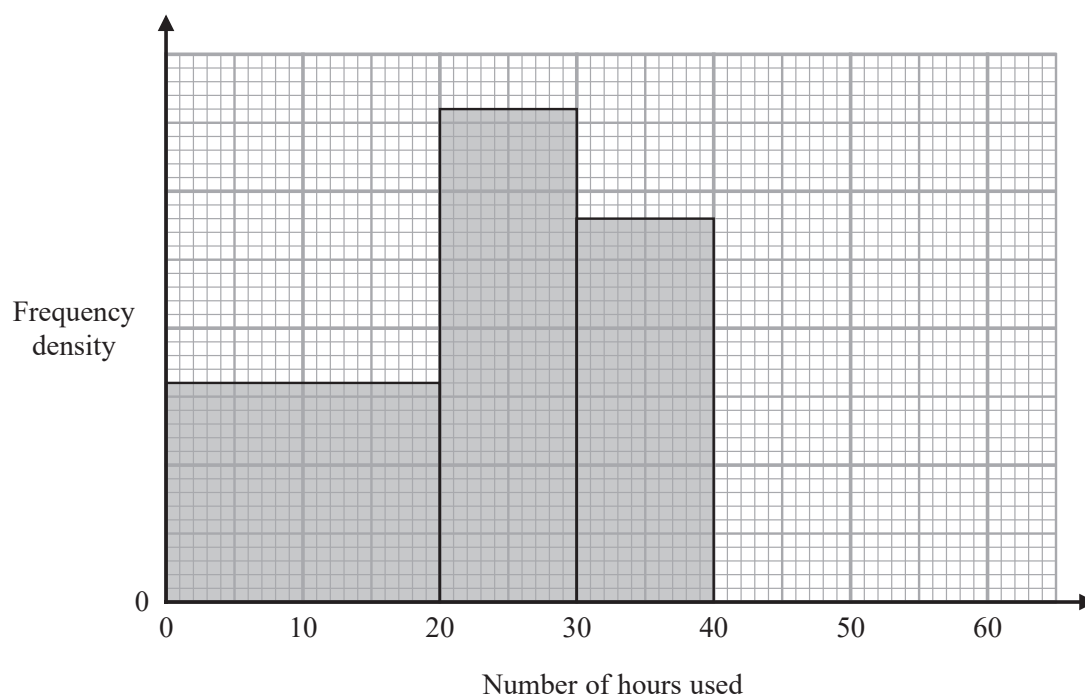
20% of the people got a score high enough for them to qualify for the second round.

Work out an estimate for the score needed to qualify for the second round.

You must show all your working.

(Total for Question 17 is 4 marks)

- 16 The histogram gives information about the number of hours some students used their phones last week.
The histogram is incomplete.



28 students used their phones for between 30 and 40 hours.

24 students used their phones for between 40 and 60 hours.

- (a) Use this information to complete the histogram.

(2)

No student used their phone for more than 60 hours.

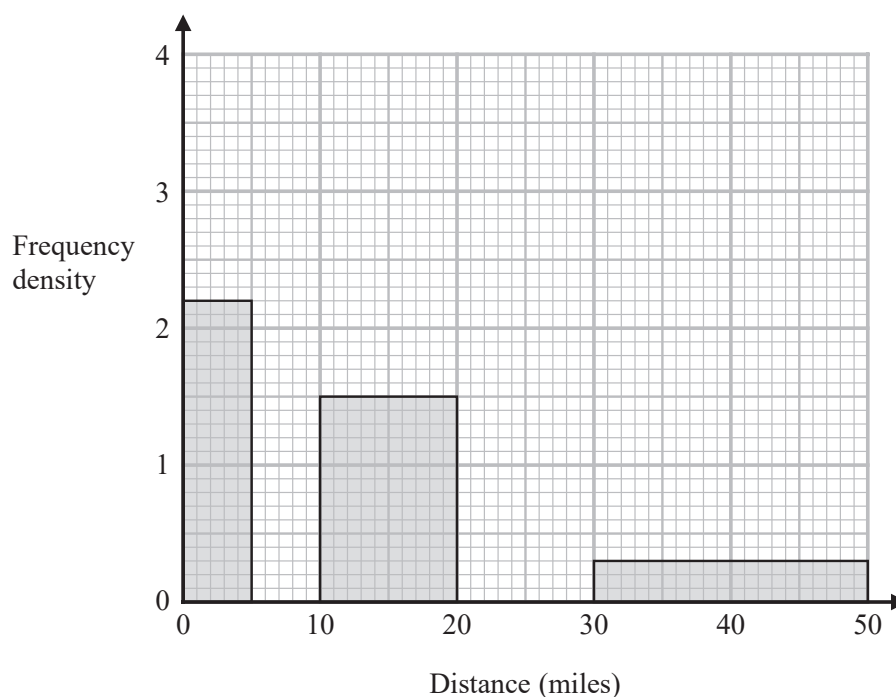
- (b) Work out the total number of students.

(2)

(Total for Question 16 is 4 marks)



- 16 The histogram gives information about the distances that 60 teachers travelled to school on Monday.
The histogram is incomplete.



11 of the teachers travelled between 0 miles and 5 miles.
None of the teachers travelled a distance greater than 50 miles.

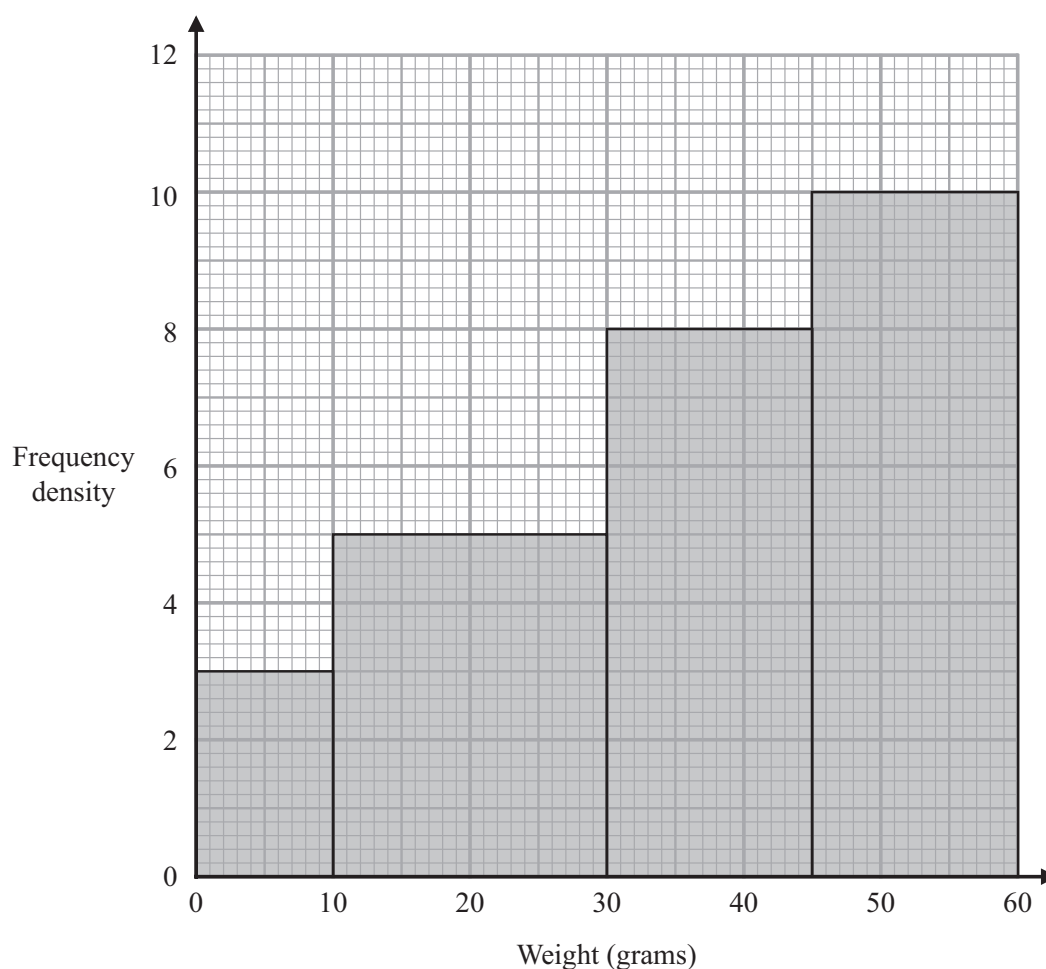
The number of teachers who travelled between 5 miles and 10 miles is the same as the number of teachers who travelled between 20 miles and 30 miles.

Complete the histogram.

(Total for Question 16 is 4 marks)



15 The histogram gives information about the weights, in grams, of some biscuits.

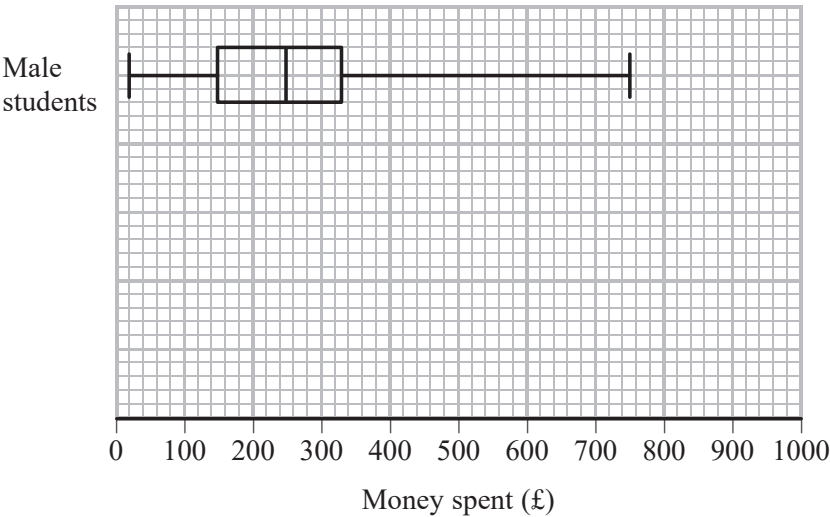


One of these biscuits is taken at random.

Work out an estimate for the probability that the biscuit will have a weight between 20 grams and 40 grams.

(Total for Question 15 is 4 marks)

9 The box plot shows information about the distribution of the amounts of money spent by some male students on their holidays.



(a) Work out the interquartile range for the amounts of money spent by these male students.

£.....
(2)

The table below shows information about the distribution of the amounts of money spent by some female students on their holidays.

	Smallest	Lower quartile	Median	Upper quartile	Largest
Money spent (£)	60	180	300	350	650

(b) On the grid above, draw a box plot for the information in the table.

(2)

Chris says,

“The box plots show that the female students spent more money than the male students.”

(c) Is Chris correct?

Give a reason for your answer.

(1)

(Total for Question 9 is 5 marks)

10 Naoby invests £6000 for 5 years.

The investment gets compound interest of $x\%$ per annum.

At the end of 5 years the investment is worth £8029.35

Work out the value of x .

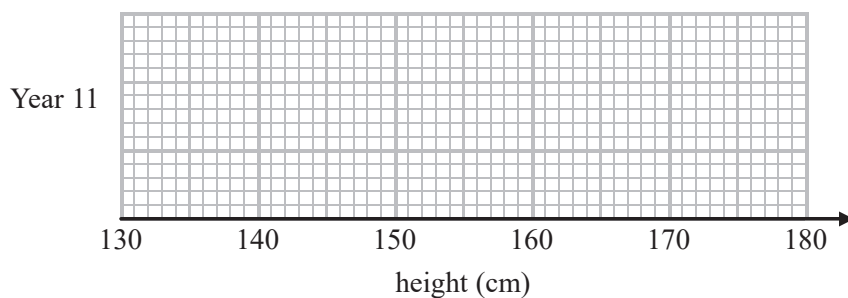
(Total for Question 10 is 3 marks)



12 The table shows information about the heights, in cm, of a group of Year 11 girls.

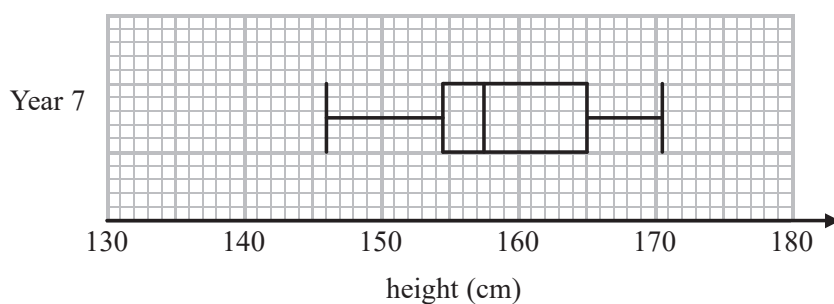
	height (cm)
least height	154
median	165
lower quartile	161
interquartile range	7
range	20

(a) Draw a box plot for this information.



(3)

The box plot below shows information about the heights, in cm, of a group of Year 7 girls.



(b) Compare the distribution of heights of the Year 7 girls with the distribution of heights of the Year 11 girls.

(2)

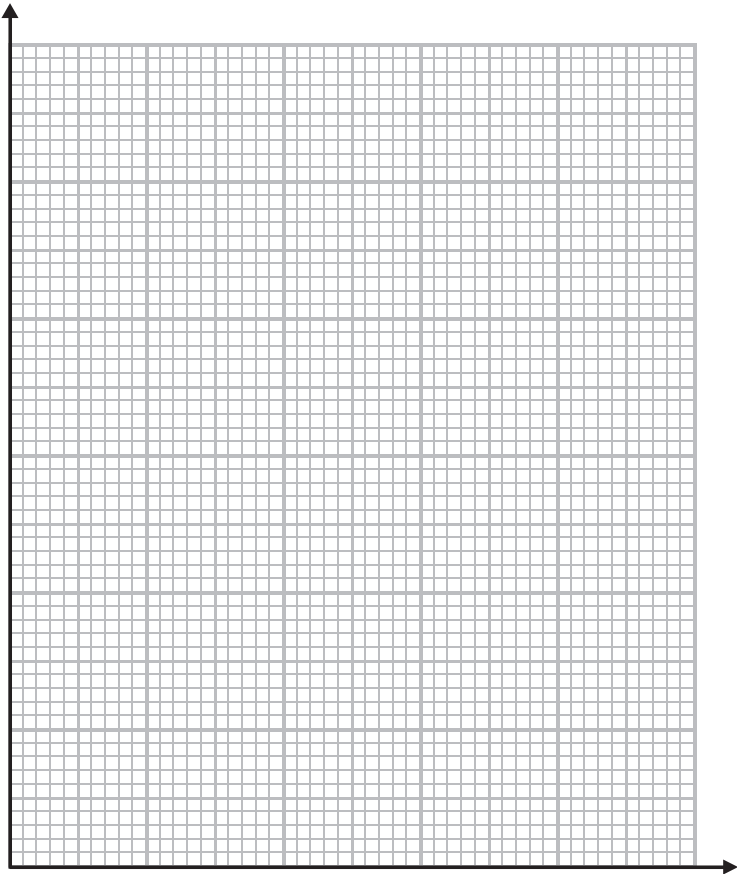
(Total for Question 12 is 5 marks)



17 The table gives information about the heights of 150 students.

Height (h cm)	Frequency
$140 < h \leq 150$	15
$150 < h \leq 155$	30
$155 < h \leq 160$	51
$160 < h \leq 165$	36
$165 < h \leq 180$	18

(a) On the grid, draw a histogram for this information.



(3)

(b) Work out an estimate for the fraction of the students who have a height between 150 cm and 170 cm.

(2)

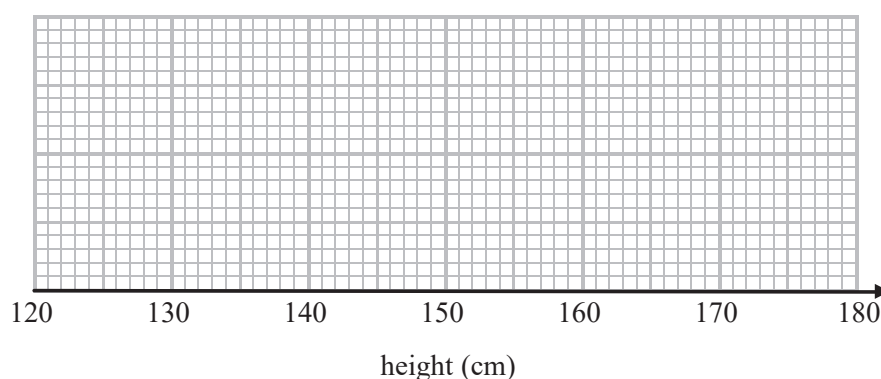
(Total for Question 17 is 5 marks)



10 The table gives some information about the heights of 80 girls.

Least height	133 cm
Greatest height	170 cm
Lower quartile	145 cm
Upper quartile	157 cm
Median	151 cm

(a) Draw a box plot to represent this information.



(3)

(b) Work out an estimate for the number of these girls with a height between 133 cm and 157 cm.

(2)

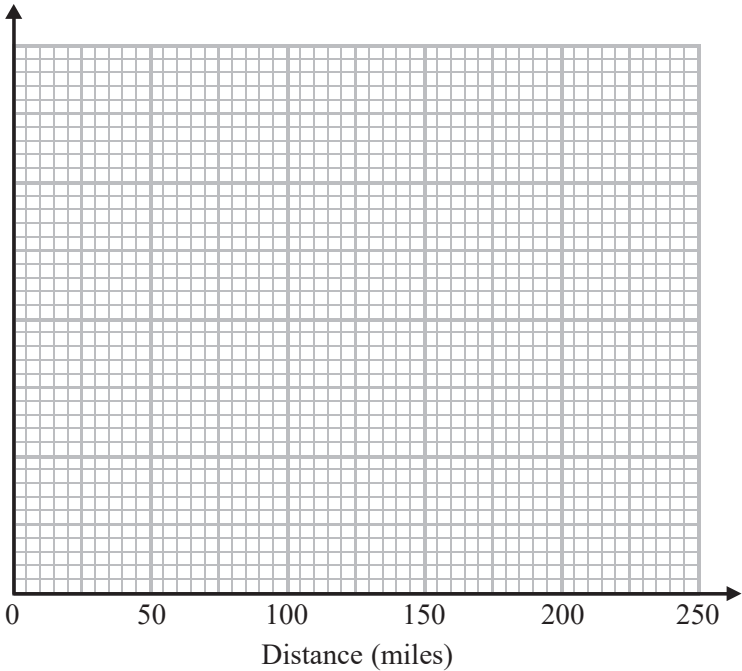
(Total for Question 10 is 5 marks)



17 The table shows information about the distances 570 students travelled to a university open day.

Distance (d miles)	Frequency
$0 < d \leq 20$	120
$20 < d \leq 50$	90
$50 < d \leq 80$	120
$80 < d \leq 150$	140
$150 < d \leq 200$	100

(a) Draw a histogram for the information in the table.



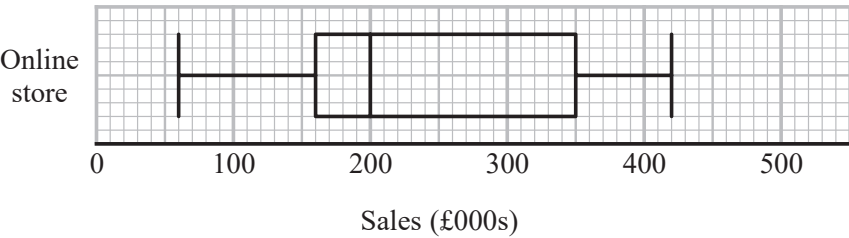
(3)

(b) Estimate the median distance.

..... miles
(2)

(Total for Question 17 is 5 marks)

10 The box plot shows information about the sales, in thousands of pounds (£000s), of an online store each month.



Andrew says,
“Three quarters of the given data lies between 160 000 and 350 000 because these are the values of the lower quartile and the upper quartile.”

Andrew is wrong.

(a) Explain why.

.....

.....

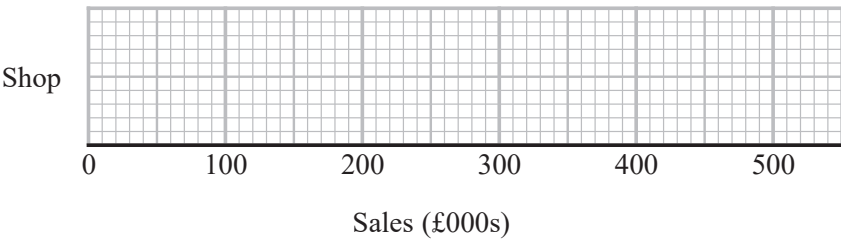
.....

(1)

The table shows information about the sales, in £000s, in a shop each month.

	Sales (£000s)
least value	30
lower quartile	80
median	170
upper quartile	260
greatest value	350

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



(2)



- (c) Compare the distribution of the sales of the online store with the distribution of the sales in the shop.

(2)

(Total for Question 10 is 5 marks)

- 11** Kieron has 13 workers he can use for a job.

He knows that 6 workers would take $14\frac{1}{2}$ days to complete this job.

Show that Kieron has enough workers to finish this job in less than 7 days.

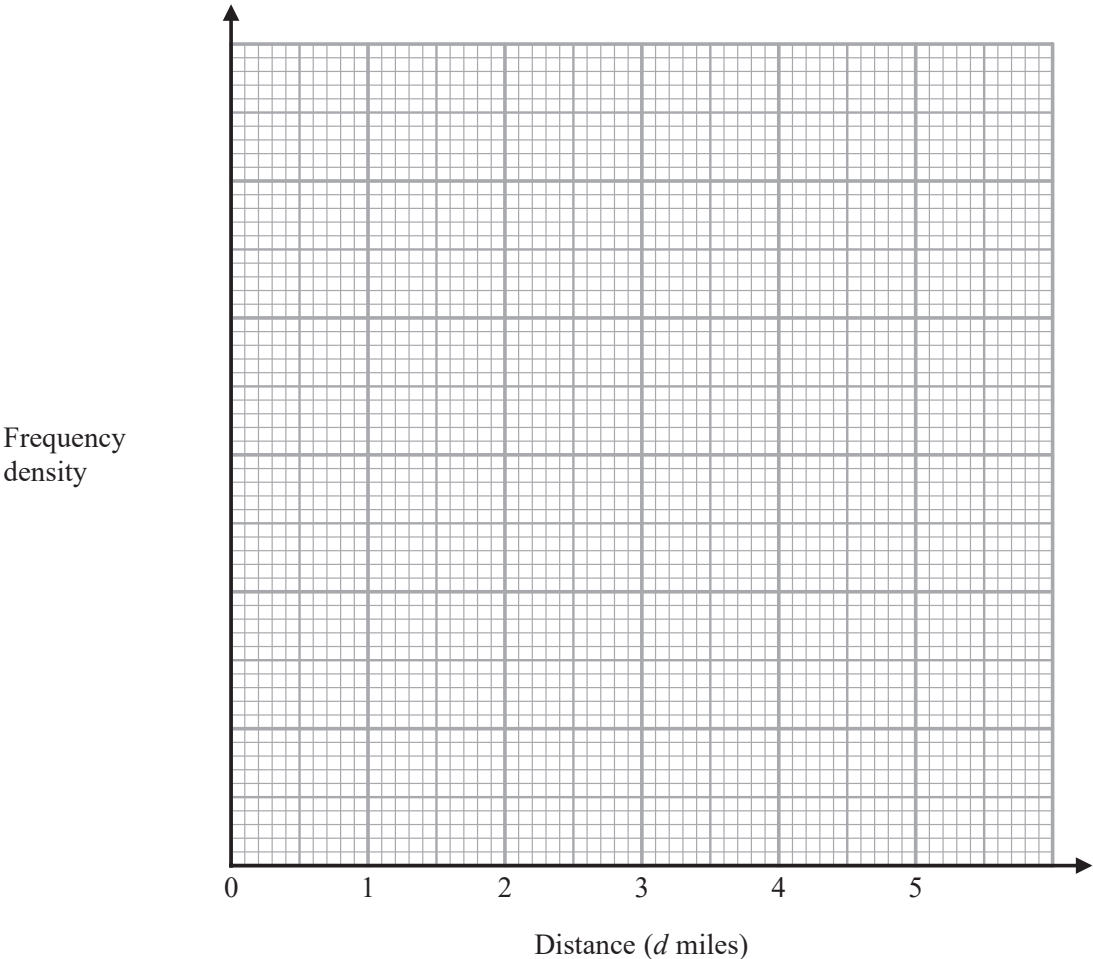
(Total for Question 11 is 3 marks)



17 The table gives information about the distances, in miles, that some Year 10 students live from school.

Distance (d miles)	Frequency
$0 < d \leq 1.0$	90
$1.0 < d \leq 1.5$	48
$1.5 < d \leq 2.0$	22
$2.0 < d \leq 3.0$	8
$3.0 < d \leq 5.0$	12

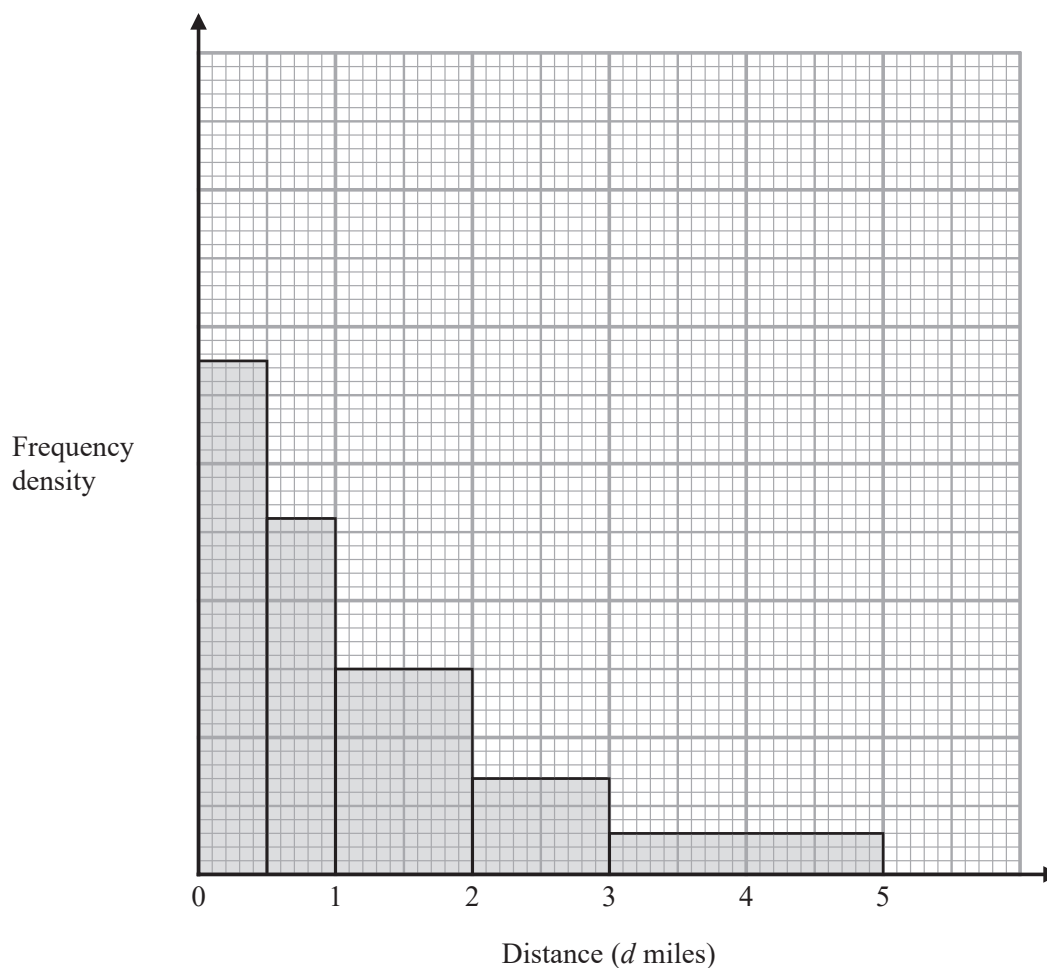
(a) On the grid, draw a histogram for this information.



(3)



The histogram below shows information about the distances, in miles, that some Year 11 students live from school.



The number of Year 11 students who live between 1 and 2 miles from school is n .

- (b) Find an expression, in terms of n , for the number of Year 11 students who live between 3 and 5 miles from school.

(2)

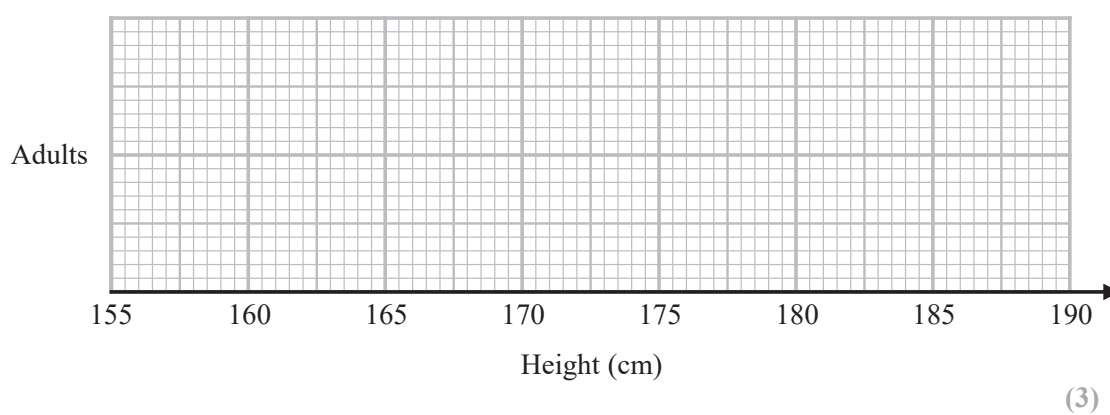
(Total for Question 17 is 5 marks)



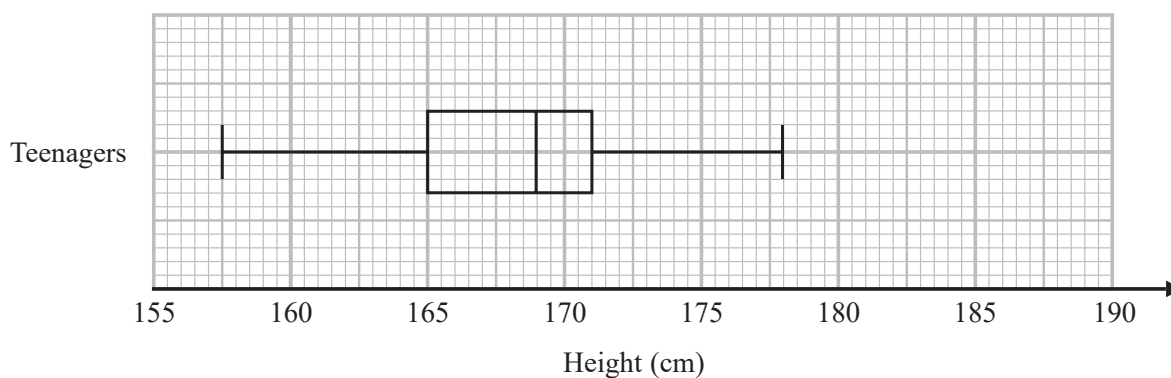
11 The table shows some information about the heights of a group of adults.

least height	169 cm
greatest height	186 cm
median	177 cm
lower quartile	174 cm
upper quartile	180 cm

(a) On the grid, draw a box plot for the information in the table.



The box plot below shows the distribution of the heights of a group of teenagers.



(b) Compare the distribution of the heights of the adults with the distribution of the heights of the teenagers.

.....

.....

.....

.....

(2)

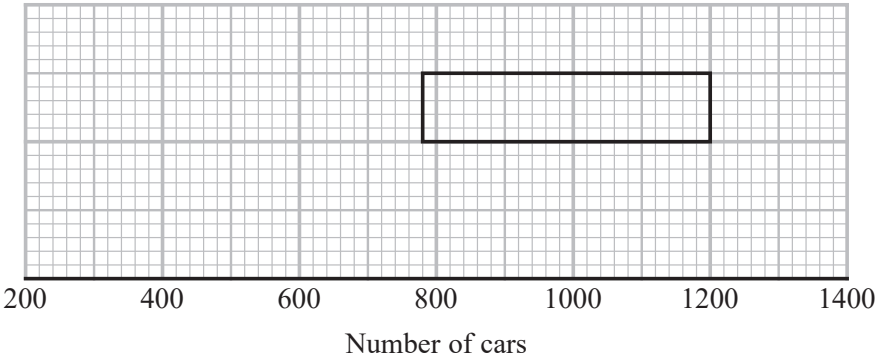
(Total for Question 11 is 5 marks)



11 Alice recorded the number of cars going into a village on each of 80 days.

The incomplete table and the incomplete box plot give information about her results.

	Number of cars
Least number	300
Lower quartile	
Median	900
Upper quartile	
Range	1000



- (a) (i) Use the information in the table to complete the box plot.
- (ii) Use the information in the box plot to complete the table.
- (3)

On some of these 80 days Alice saw fewer than 1200 cars going into the village.

- (b) Work out an estimate for the number of days Alice saw fewer than 1200 cars going into the village.

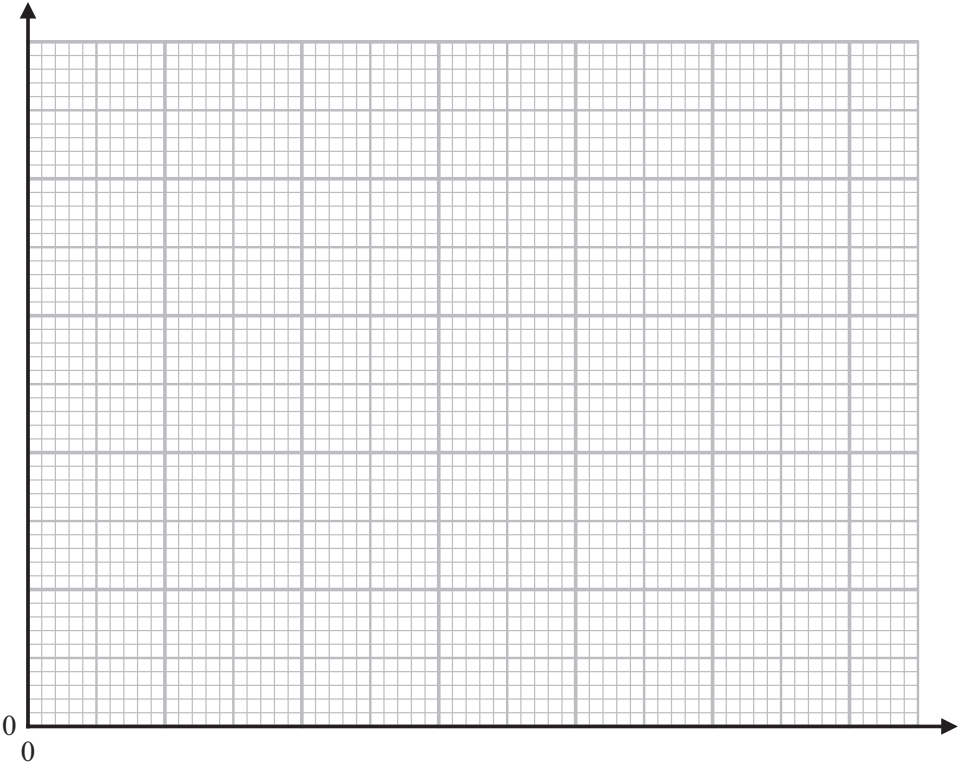
(2)

(Total for Question 11 is 5 marks)

13 The table gives information about the amount of time that each of 150 people were in a shop.

Time (t minutes)	Frequency
$0 < t \leq 10$	20
$10 < t \leq 30$	70
$30 < t \leq 35$	22
$35 < t \leq 50$	30
$50 < t \leq 60$	8

(a) On the grid, draw a histogram for this information.



(3)

(b) Work out an estimate for the fraction of these 150 people who were in the shop for between 20 minutes and 40 minutes.

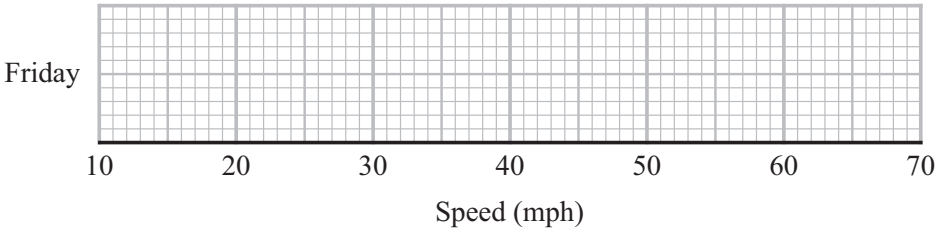
(2)

(Total for Question 13 is 5 marks)

11 Mina records the speeds, in mph, of some cars on a road on Friday. She uses her results to work out the information in this table.

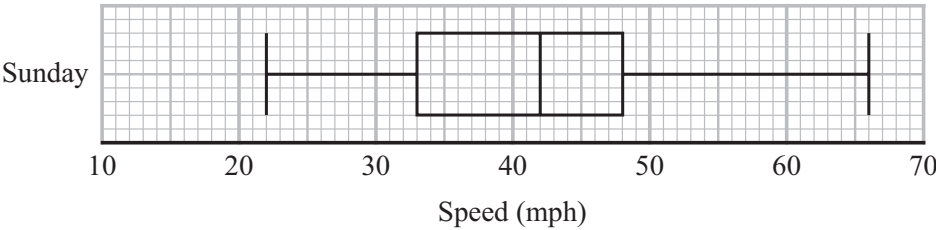
	Speed (mph)
Lowest speed	25
Lower quartile	35
Median	40
Interquartile range	12
Range	37

(a) On the grid, draw a box plot to show the information in the table.



(3)

Mina also records the speeds of some cars on the same road on Sunday. She uses her results to draw this box plot.



(b) Compare the distribution of the speeds on Friday with the distribution of the speeds on Sunday.

.....

.....

.....

.....

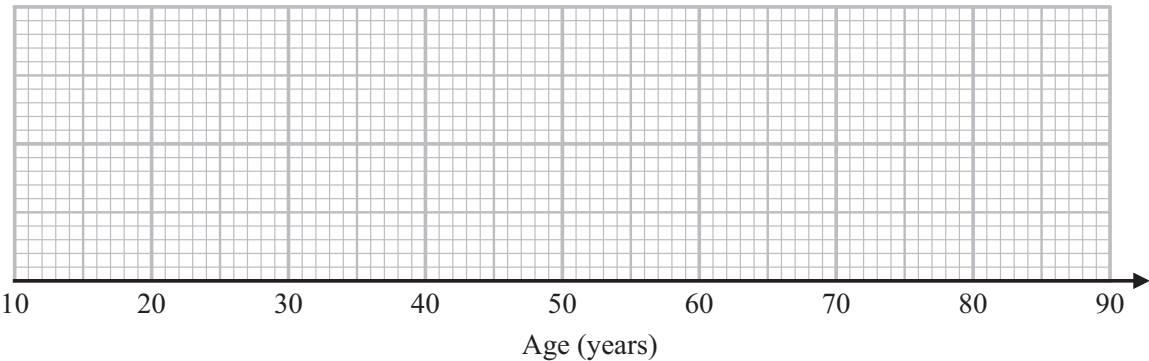
(2)

(Total for Question 11 is 5 marks)

12 The table gives some information about the ages, in years, of 32 actors.

Lowest age	21
Highest age	80
Lower quartile	31
Upper quartile	42
Median	35

(a) Draw a box plot to represent this information.



(3)

(b) Work out an estimate for the number of these actors with an age between 31 years and 42 years.

(1)

Mary says,

“At least one of the actors is 35 years old because the median is 35”

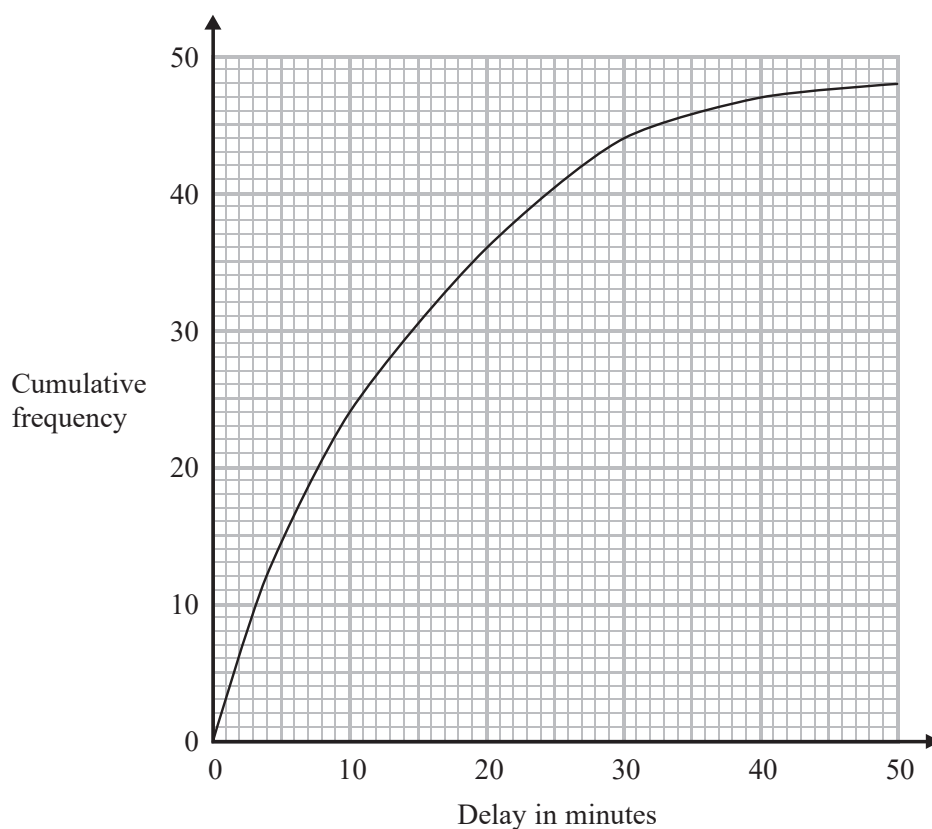
(c) Is Mary correct?
Give a reason for your answer.

(1)

(Total for Question 12 is 5 marks)

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

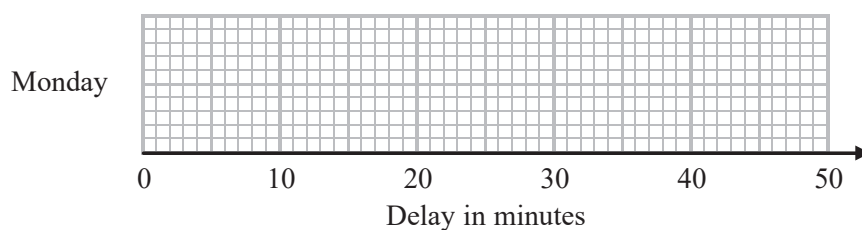
The cumulative frequency graph gives information about the numbers of minutes the trains were delayed, correct to the nearest minute.



The shortest delay was 0 minutes.

The longest delay was 42 minutes.

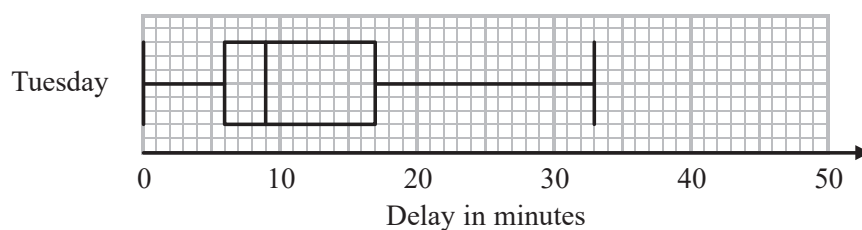
- (a) On the grid below, draw a box plot for the information about the delays on Monday.



(3)

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.

.....

.....

.....

.....

(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.

.....

.....

(1)

(Total for Question 9 is 6 marks)

10 (a) Simplify $\frac{x-1}{5(x-1)^2}$

.....

(1)

(b) Factorise fully $50 - 2y^2$

.....

(2)

(Total for Question 10 is 3 marks)



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

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

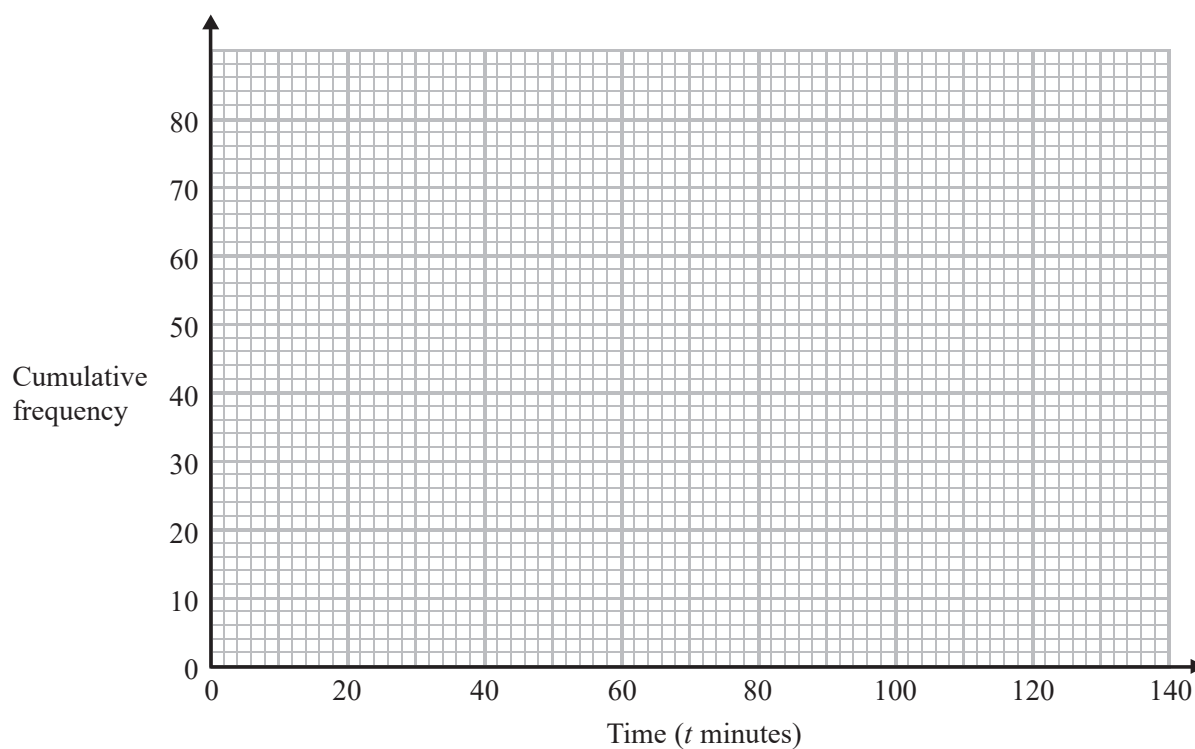
- (a) Complete the cumulative frequency table.

Time (t minutes)	Cumulative frequency
$0 < t \leq 20$	
$0 < t \leq 40$	
$0 < t \leq 60$	
$0 < t \leq 80$	
$0 < t \leq 100$	
$0 < t \leq 120$	

(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.

..... %

(3)

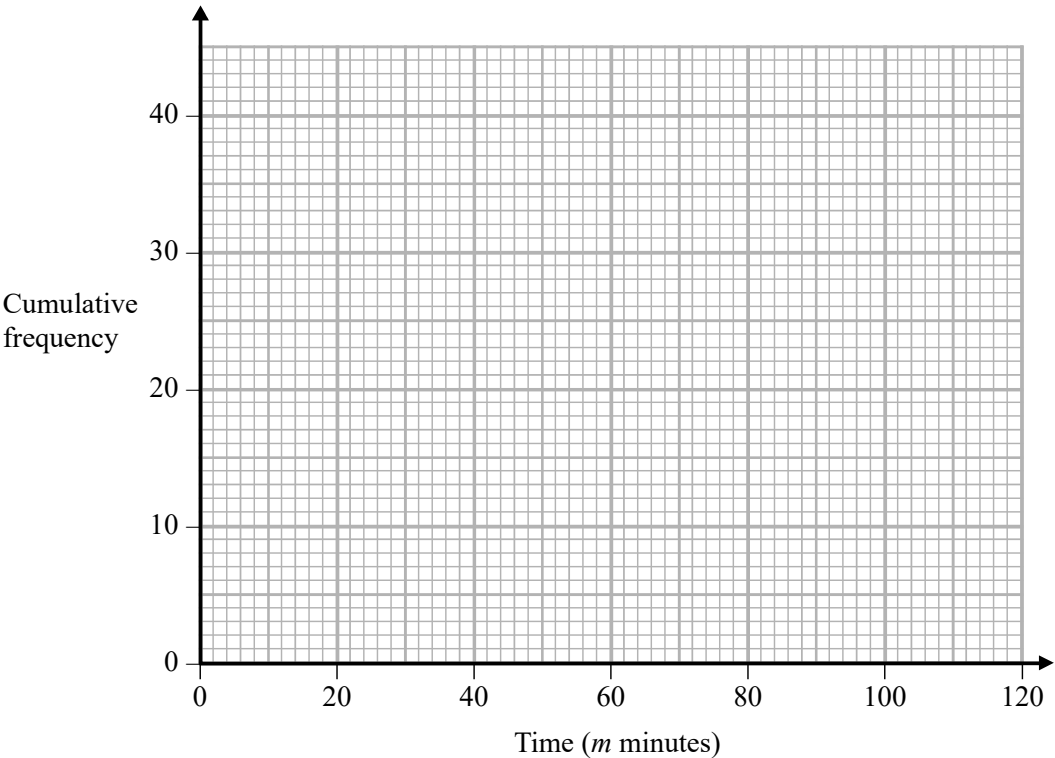
(Total for Question 11 is 6 marks)



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

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

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



(2)



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

..... 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.

.....
(2)

(Total for Question 10 is 6 marks)



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

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

(a) Complete the cumulative frequency table.

Wage (£ w)	Cumulative frequency
$200 < w \leq 250$	
$200 < w \leq 300$	
$200 < w \leq 350$	
$200 < w \leq 400$	
$200 < w \leq 450$	
$200 < w \leq 500$	

(1)

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

(2)

Juan says

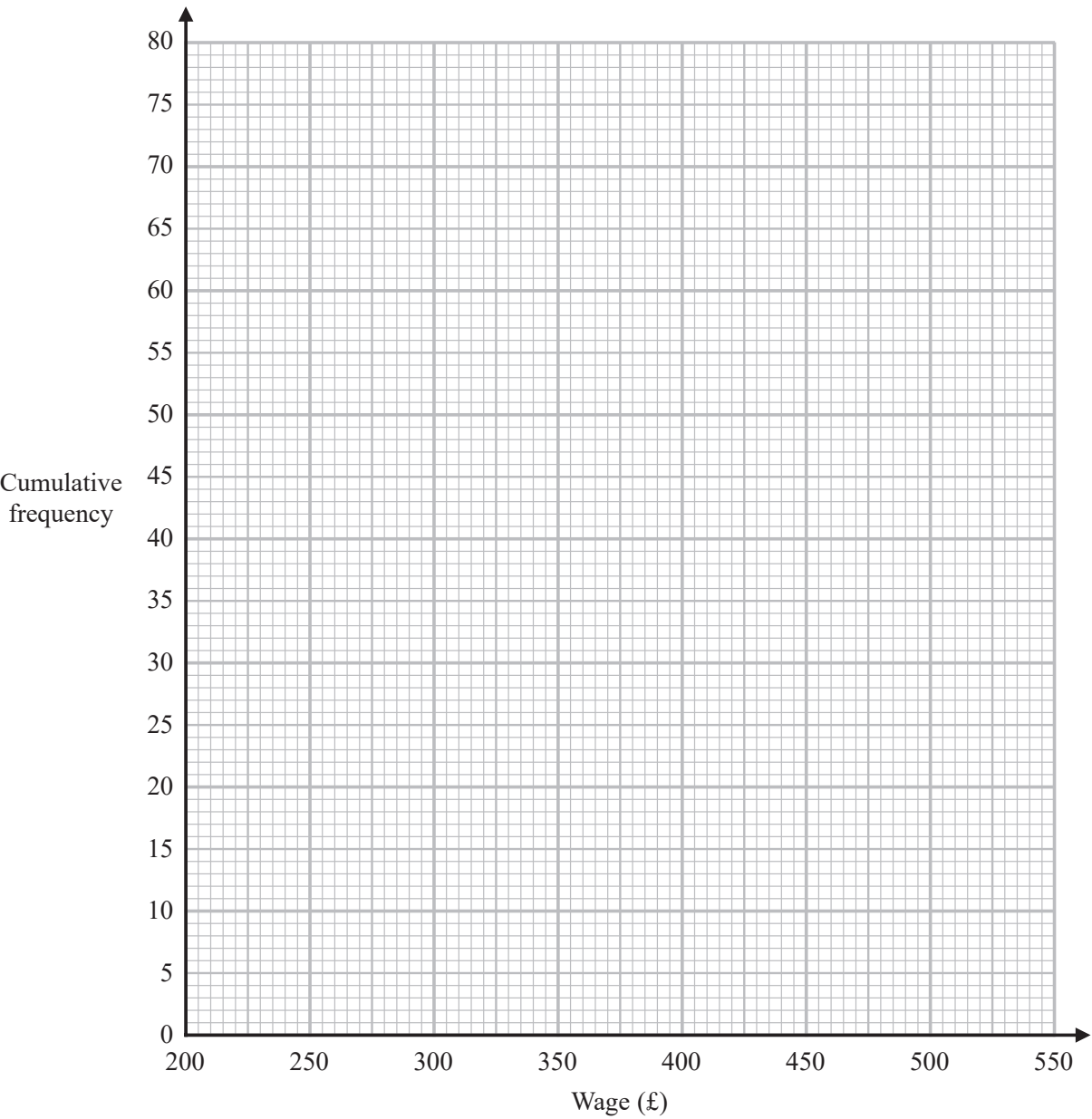
“60% of this group of people have a weekly wage of £360 or less.”

(c) Is Juan correct?

You must show how you get your answer.

(3)





(Total for Question 12 is 6 marks)



- 10 The table shows some information about the profit made each day at a cricket club on 100 days.

Profit (£ x)	Frequency
$0 \leq x < 50$	10
$50 \leq x < 100$	15
$100 \leq x < 150$	25
$150 \leq x < 200$	30
$200 \leq x < 250$	5
$250 \leq x < 300$	15

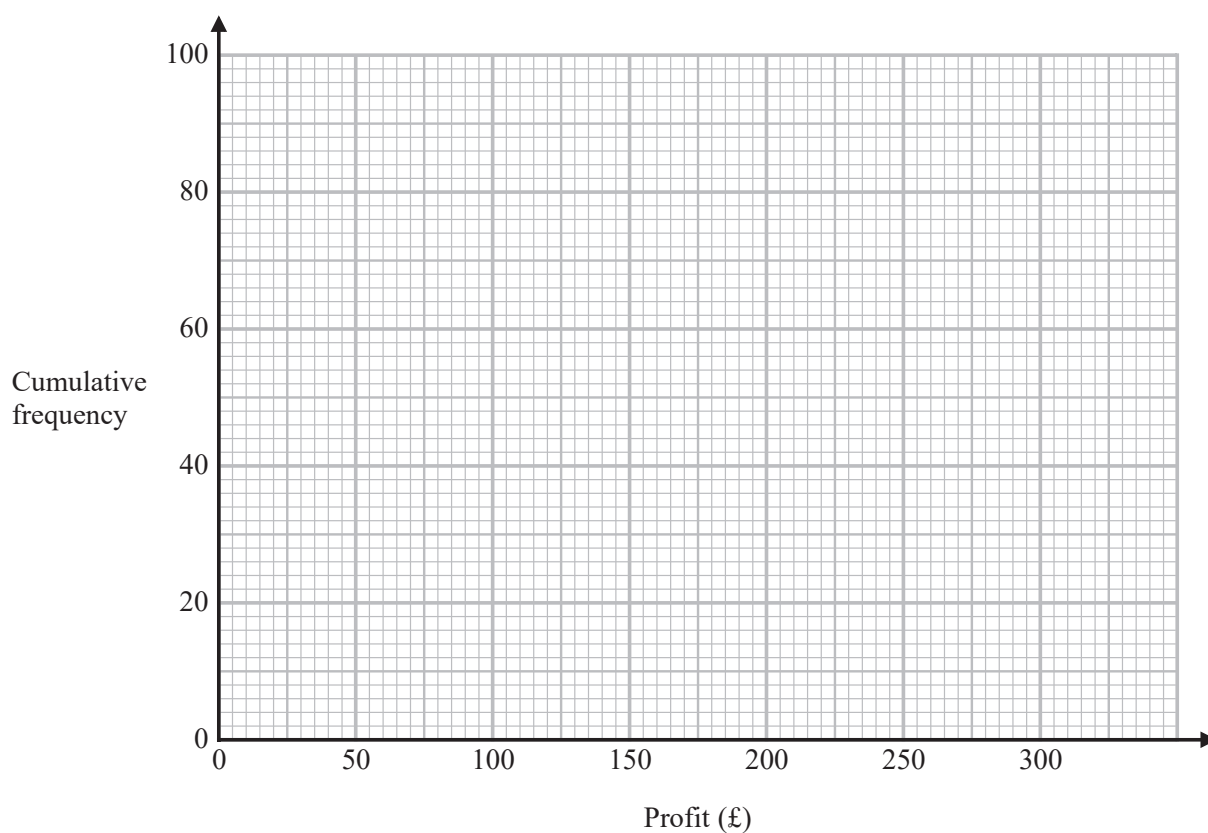
- (a) Complete the cumulative frequency table.

Profit (£ x)	Cumulative frequency
$0 \leq x < 50$	
$0 \leq x < 100$	
$0 \leq x < 150$	
$0 \leq x < 200$	
$0 \leq x < 250$	
$0 \leq x < 300$	

(1)



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



(2)

(c) Use your graph to find an estimate for the number of days on which the profit was less than £125

..... days
(1)

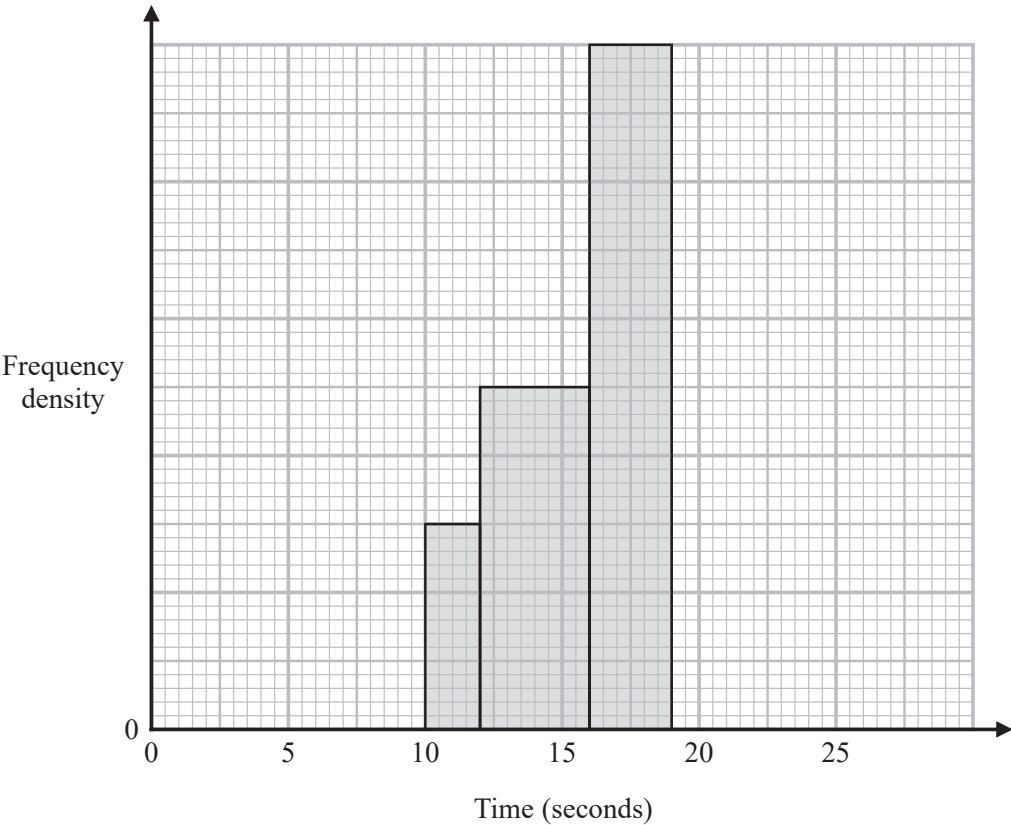
(d) Use your graph to find an estimate for the interquartile range.

£.....
(2)

(Total for Question 10 is 6 marks)

15 The incomplete table and the incomplete histogram give information about the times taken by some students to run a race.

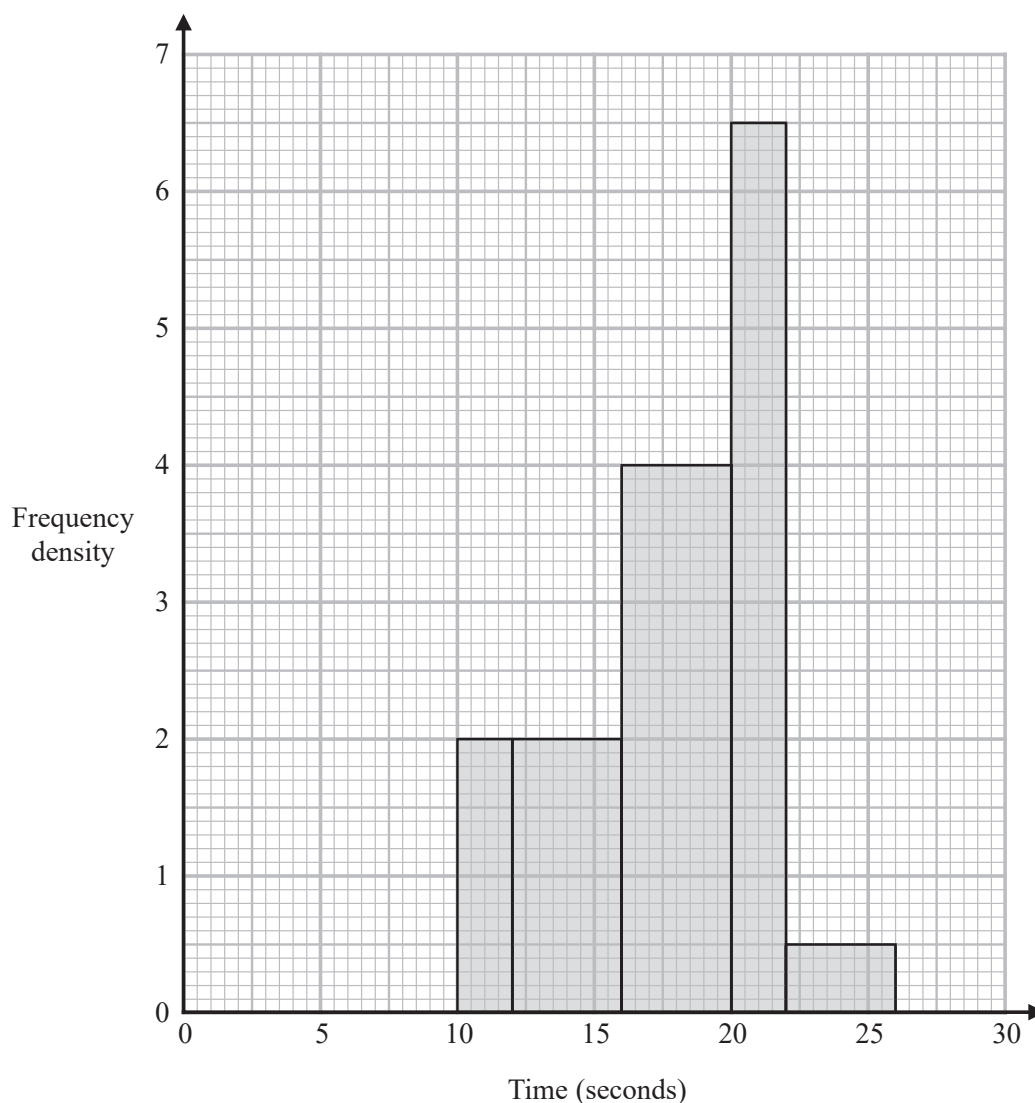
Time (t seconds)	Frequency
$10 < t \leq 12$	
$12 < t \leq 16$	10
$16 < t \leq 19$	15
$19 < t \leq 21$	9
$21 < t \leq 26$	7



None of these students had a time for the race such that $t \leq 10$ or $t > 26$

- (a) Use the histogram to complete the table. (1)
- (b) Use the table to complete the histogram. (2)

The histogram below gives information about the times taken by 43 students to run a different race.



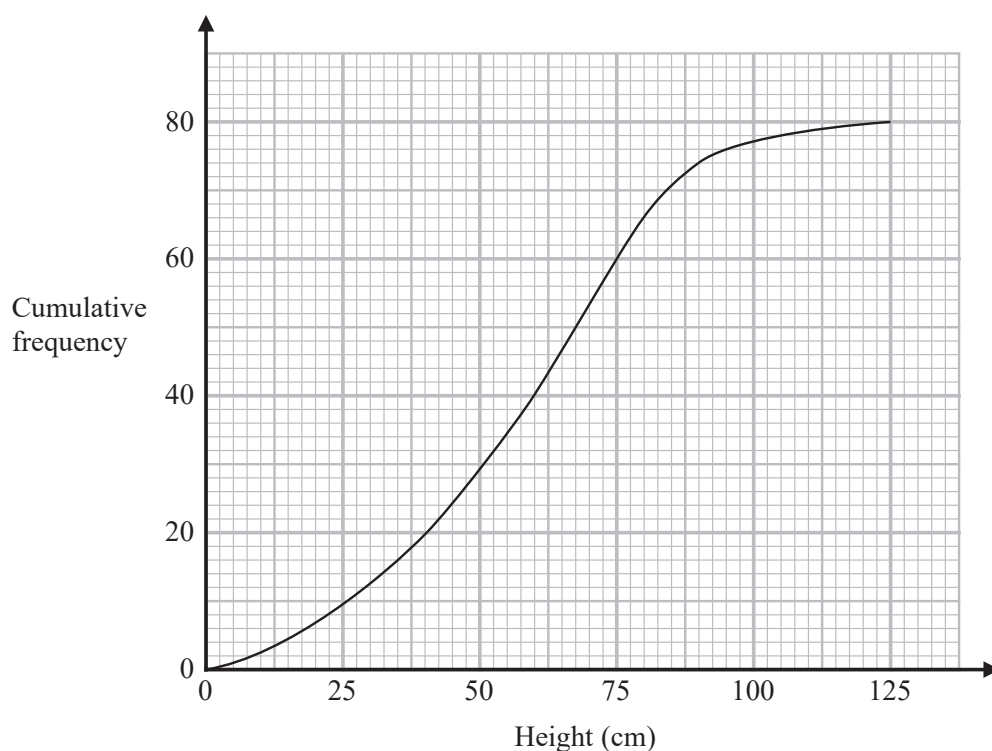
- (c) Work out an estimate for the median of the times taken by these 43 students to run the race.

..... seconds
(3)

(Total for Question 15 is 6 marks)

13 Alan grew 80 plants of the same type outside.

The cumulative frequency graph shows information about the heights, in cm, of these plants.



One of the plants is chosen at random.

- (a) Find an estimate for the probability that this plant will have a height greater than 90 cm.

.....
(2)

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

..... cm
(1)



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

..... cm
(2)

Alan also grew plants of the same type inside.
The interquartile range of the heights of these plants is 30 cm.

(d) Give one comparison between the distribution of the heights of the plants grown inside with the distribution of the heights of the plants grown outside.

.....
.....
.....
.....
(1)

(Total for Question 13 is 6 marks)

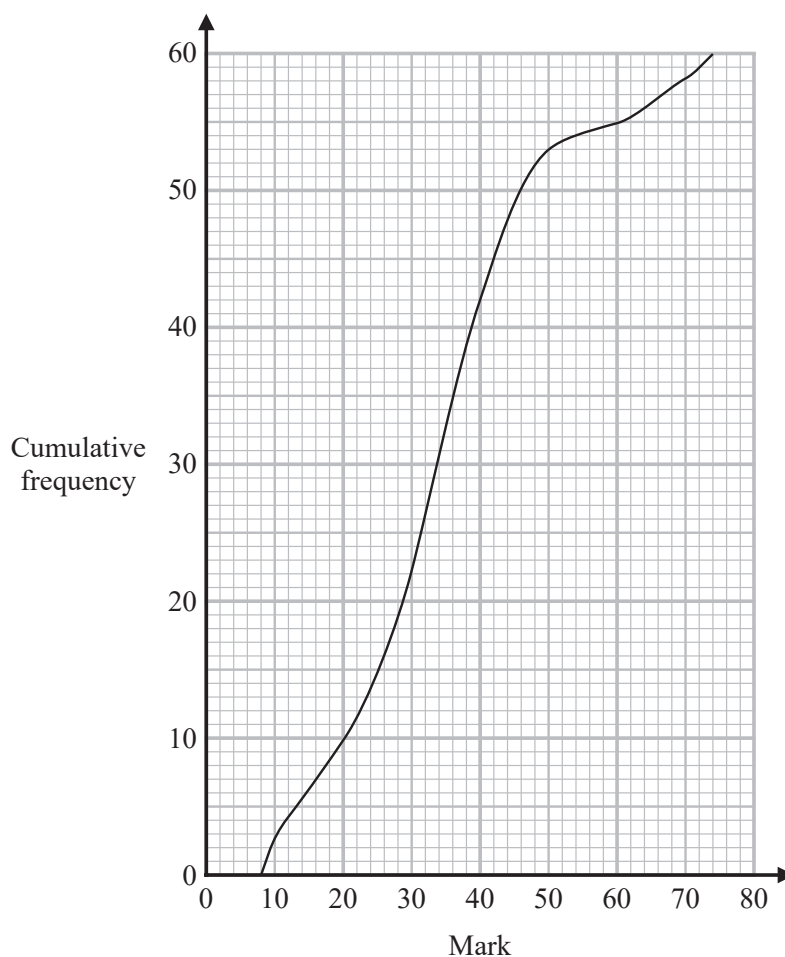
14 Here are the first six terms of a quadratic sequence.

5 11 21 35 53 75

Find an expression, in terms of n , for the n th term of this sequence.

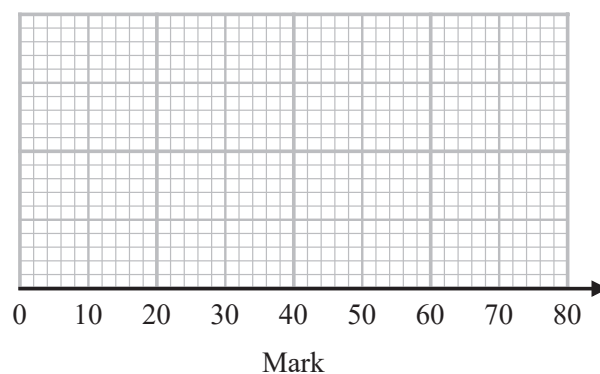
.....
(Total for Question 14 is 2 marks)

- 9 The cumulative frequency graph gives information about the marks that 60 students got in a test.



For these 60 students
 the highest mark was 74
 the lowest mark was 8

- (a) On the grid below, draw a box plot for the distribution of the marks.



(3)



The pass mark for the test was 40

Sian says,

“30% of the 60 students passed the test.”

(b) Is Sian correct?

You must show how you get your answer.

(3)

(Total for Question 9 is 6 marks)

10 (a) Work out $25^{\frac{1}{2}} \times 8^{\frac{1}{3}}$

(2)

(b) Find the value of $\left(\frac{1}{32}\right)^{\frac{3}{5}}$

(2)

(Total for Question 10 is 4 marks)



11 The frequency table gives information about the weights of 60 parcels.

Weight (w kg)	Frequency
$0 < w \leq 2$	7
$2 < w \leq 4$	21
$4 < w \leq 6$	15
$6 < w \leq 8$	11
$8 < w \leq 10$	6

(a) Complete the cumulative frequency table.

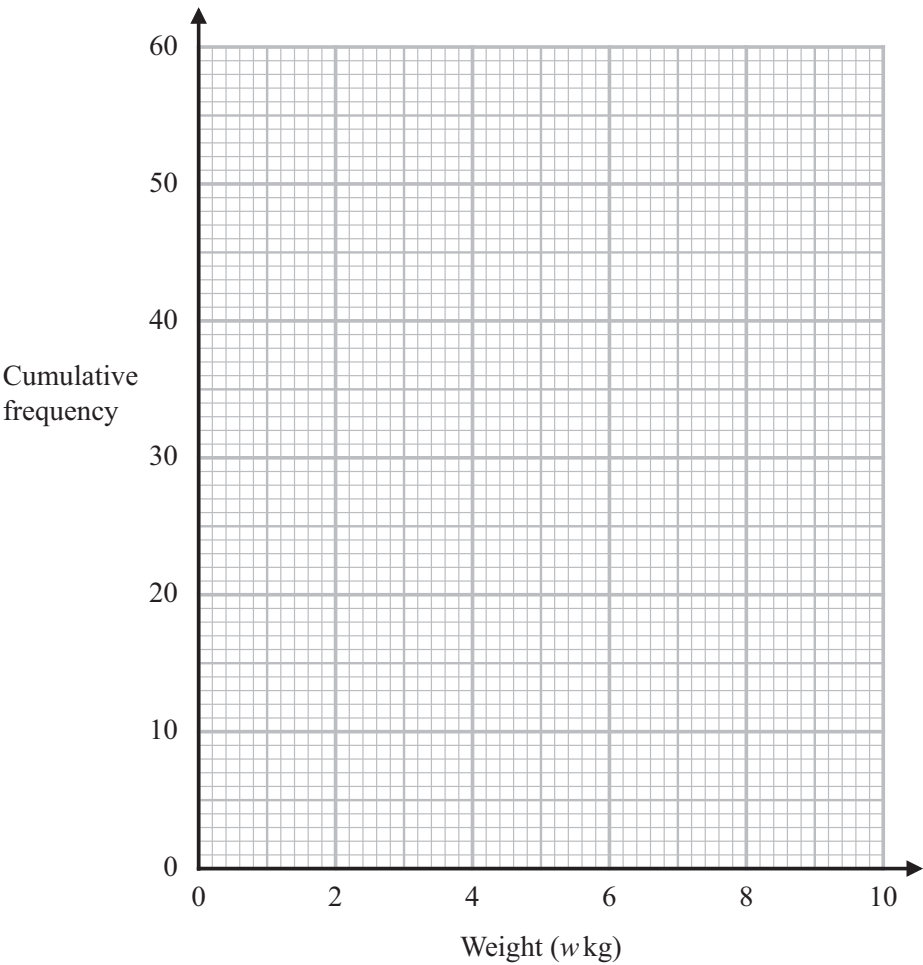
Weight (w kg)	Cumulative frequency
$0 < w \leq 2$	
$0 < w \leq 4$	
$0 < w \leq 6$	
$0 < w \leq 8$	
$0 < w \leq 10$	

(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 interquartile range.

..... kg
(2)

(d) Use your graph to find an estimate for the number of these parcels with a weight greater than 7.4 kg.

.....
(2)

(Total for Question 11 is 7 marks)

MARK SCHEMES

official mark schemes, in the same order as the questions



Paper: 1MA1/1H				
Question	Answer	Mark	Mark scheme	Additional guidance
11	72	M1 A1	for $\frac{5}{30} = \frac{12}{p}$ oe, eg $\frac{12}{p} \times 30 = 5$ or $12 \div \frac{5}{30}$ or $5 : 30 = 12 : p$ or 1 in 6 ($30 \div 5$) counters are yellow, so $12 \times "6"$ or using equivalent ratios to $5 : 30$, eg. $2 : 12$ and $10 : 60$ and adding to give $2 + 10 : 12 + 60$	
12	Mistake identified	C1	for a correct mistake identified Acceptable examples all three terms should be multiplied by 2 and not just two of them the 5 should be multiplied by 2 it should be $2 \times T = q + 2 \times 5$ should subtract 5 first (before multiplying by 2) Not acceptable examples Should remove the 5 first $2 \times T$ should be $2T$ should have got rid of the denominator	Accept answers showing a correct first step
13 (a)	$\frac{17x+2}{3x(x+1)}$	M1 A1	for a correct common denominator with at least one correct numerator eg. $\frac{5 \times 3x}{3x(x+1)} + \frac{2(x+1)}{3x(x+1)}$ for a single simplified fraction, eg. $\frac{17x+2}{3x(x+1)}$ or equivalent eg. $\frac{17x+2}{3x^2+3x}$	$\frac{15x+2(x+1)}{3x(x+1)}$ gets M1 only
(b)	$(x+y)(x+y+3)$	B1	cao	

Paper: 1MA1/2H				
Question	Answer	Mark	Mark scheme	Additional guidance
3 (i)	65	M1	for working with proportion eg $10 \div 30 \times 195 (=65)$	Condone use of 200 for 195
		A1	cao	
(ii)	statement	C1	for statement Acceptable examples sample is representative (otherwise answer wrong) random sample (otherwise answer will be different) the 30 students are from the 195 (otherwise not accurate) 10 out of every 30 want to go to the Theme Park (otherwise answer will be different/wrong) there is no bias Not acceptable examples There would be more than 10 people who want to go to the Theme Park I rounded my answer	
4	8	P1	for working with volume of the cuboid, eg $30 \times 6 \times 19 (= 3420)$ OR for using $\frac{2}{3}$ with one dimension, eg. $30 \times 2 \div 3 (= 20)$	For P marks, ignore attempts at unit conversion
		P1	for “3420” $\times 2 \div 3 (= 2280)$ or “3420” $\div 3 (= 1140)$ OR “20” $\times 6 \times 19 (= 2280)$ OR “3420” $\div 275 (= 12.4\dots = 12 \text{ cups})$	
		P1	(dep on P2) for “2280” $\div 275 (= 8(.29\dots))$ or “1140” $\div 275 (= 4(.14\dots))$ OR “12” $\times 2 \div 3$ OR for $275 \times 8 (= 2200)$ or $275 \times 9 (= 2475)$	
		A1	cao	

Paper: 1MA1/2H				
Question	Answer	Mark	Mark scheme	Additional guidance
4 (i)	238	P1 A1	for working with proportion eg $\frac{17}{50} \times 700$ oe cao	
(ii)	statement	C1	for statement Acceptable Sample is representative (otherwise answer wrong) Random sample (otherwise answer will be different) The 50 people are from the 700 (otherwise not accurate) 17 out of every 50 want a sports bag (otherwise answer will be different / wrong) There is no bias That the other 650 will want the same gifts as the 50 Not acceptable There would be more than 17 people who want the sports bag I rounded my answer 17 out of 50 want a sports bag A repeat of the calculation done in (i) Most of the people would want a sports bag References as what might change in the future (eg a change in membership) That all 700 people wanted a type of gift rather than no gift (otherwise would have changed my answer)	
5 (a)	F	B1	cao	
(b)	D	B1	cao	
6	Shown (supported)	M1 M1 A1	for method to find at least two terms, eg $2 \times 4^2 - 1 (= 31)$ and $40 - 3^2 (= 31)$ for generating at least three correct terms of each sequence for generating at least the terms 1, 7, 17, 31, 49 of the first sequence and at least the terms 39, 36, 31, 24, 15, 4 of the second sequence	1 7 17 31 49 71 97 127 161 199 39 36 31 24 15 4 -9



Paper: 1MA1/2H				
Question	Answer	Mark	Mark scheme	Additional guidance
14	1220	P1	for $\frac{45}{305}$ (= 0.147...) or $\frac{180}{45}$ (= 4) or $\frac{305}{45}$ (= 6.77...)	Decimal values truncated or rounded to 2 dp or more
			or $\frac{45}{180}$ (= 0.25)	
		P1	for $\frac{45}{305} = \frac{180}{n}$ or $\frac{45}{180} = \frac{305}{n}$ or $\frac{180 \times 305}{45}$	
		A1	cao	

Paper: 1MA1/1H				
Question	Working	Answer	Mark	Notes
11		Tea £1.40 Coffee £1.80	P1	for setting up two appropriate equations eg $3t + 2c = 7.80$, $5t + 4c = 14.20$
			M1	for method to eliminate one variable, condone one arithmetic error
			M1	for method to substitute found variable or start again
			A1	Tea £1.4(0) and Coffee £1.8(0) with amounts linked to correct drinks
12 (a)	161 + 7 154 + 20	Box plot	M1	for method to find UQ (168) or highest value (174), may be implied by correct values plotted
			M1	for showing a box and at least 3 correctly plotted values from 154, 161, 165, 168, 174
			A1	for fully correct box plot
(b)	Med IQR Range Y11 165 7 20 Y7 157.5 10.5 24.5	Comparison	C1	(ft) for comparison of the median
			C1	(ft) for comparison of the spread NB: for award of both marks, at least one comparison must be in context. NB: figures need not be stated, but if they are they must be correct (ft)
13 (a)		120	P1	for $\frac{4 \times 450}{15}$ or $\frac{4}{15} = \frac{x}{450}$ oe
			A1	cao
			P1	5.5 or 6.5 or 165 or $\frac{5 \times 450}{15}$ (=150) and $\frac{6 \times 450}{15}$ (=180)
			A1	for $\frac{165}{450}$ oe
(b)		$\frac{165}{450}$		

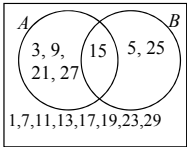


Paper: 1MA1/1H				
Question	Answer	Mark	Mark scheme	Additional guidance
15	$y = -\frac{1}{3}x + 8$	M1 M1 A1	for a method for finding the gradient of L_2 eg use of $-\frac{1}{m}$ or $-\frac{1}{3}$ (dep) for substitution of (9, 5) into $y = -\frac{1}{3}x + c$ for $y = -\frac{1}{3}x + 8$ oe	$y - 5 = -\frac{1}{3}(x - 9)$ gets M2A1
16 (a)	540	P1 P1 A1	for $\frac{120}{20} (=6)$ or $\frac{20}{120} (=0.16\ldots)$ or $\frac{90}{20} (=4.5)$ or $\frac{20}{90} (=0.22\ldots)$ for $\frac{20}{120} = \frac{90}{n}$ or $\frac{20}{90} = \frac{120}{n}$ or $\frac{90 \times 120}{20}$ oe cao	Decimal values truncated or rounded to 2 dp or more
(b)	Explanation	C1	for explanation Acceptable examples If marks fall off Shirley will have over-estimated the number of bees There will be fewer bees Her amount will go down Not acceptable examples My answer will be wrong It will increase the answer	

Paper: 1MA1/2H				
Question	Answer	Mark	Mark scheme	Additional guidance
15 (a)	70	P1	for $\frac{20}{12}$ (= 1.66..) or $\frac{12}{20}$ (= 0.6) or $\frac{12}{42}$ (= 0.2857..) or $\frac{42}{12}$ (= 3.5)	Decimal values truncated or rounded to 2 dp or more
		P1	for $\frac{20}{n} = \frac{12}{42}$ or $\frac{12}{20} = \frac{42}{n}$ or $\frac{20 \times 42}{12}$	
		A1	cao	
	(b) Explanation	C1	for explanation Acceptable examples the sample size cannot be greater than the population the population is greater than the sample size there are more than 50 rabbits he catches 55 rabbits Not acceptable examples the sample size is too small some of the tags could fall off he has underestimated	
16	$y \geq 3x + 6$	M1	for $y = 6$ indicated or $x = -3$ indicated	Accept any inequality in place of “=” for all method marks Equations/inequalities may be seen on the diagram
	$x \geq -3$	M1	for $y = 3x + 6$ oe indicated	
	$y \geq -\frac{x}{2} + 1$	M1	for $y = -\frac{x}{2} + 1$ oe indicated	
	$y \leq 6$	A1	for $y \geq 3x + 6$ oe, $x \geq -3$, $y \geq -\frac{x}{2} + 1$ oe and $y \leq 6$	

Paper: 1MA1/3H				
Question	Answer	Mark	Mark scheme	Additional guidance
18 (a)	200	P1	for $\frac{55}{11}$ (= 5) or $\frac{11}{55}$ (= 0.2) or $\frac{40}{11}$ (= 3.63...) or $\frac{11}{40}$ (= 0.275) or for starting to use ratio eg tagged : untagged = 11 : 44 oe	Allow decimal values truncated or rounded to at least 2dp
		P1	for $\frac{11}{55} = \frac{40}{n}$ or $\frac{11}{40} = \frac{55}{n}$ or $\frac{55 \times 40}{11}$ oe or for process to find the number of untagged frogs eg $\frac{55-11}{11} \times 40$ (= 160)	May be seen in ratio eg 40 : 160
		A1	cao	A correct answer with no supportive working gets 0 marks.
(b)	Assumption	C1	for a suitable assumption, Acceptable examples no frogs have left/arrived at the lake no tags have fallen off / no lost tags sample of frogs taken was a random sample / this is a representative sample tagged frogs are distributed around the lake no baby frogs / no frogs have died There are (still) 4 untagged for every tagged frog. The tagged frogs had time to blend into the population. It is a closed environment There aren't any more frogs in the lake No other frogs in the lake Not acceptable examples She has caught all the frogs There are lots of frogs. This is the same lake	

Paper: 1MA1/2H				
Question	Answer	Mark	Mark scheme	Additional guidance
7	1.6	P1 P1 A1	for $1.8 \times 80 (= 144)$ or $1.2 \times 40 (= 48)$ or for 192 or for $80 : 40 = 2 : 1$ for $(("144" + "48") \div (80 + 40))$ or $192 \div 120$ or for $(1.8 \times 2 + 1.2) \div 3$ or $4.8 \div 3$ oe	
8	Error in inequalities	C1	for identifying incorrect inequalities Acceptable examples gives at least one correct inequality eg $(10 < t \leq 20)$ should be $0 < t \leq 20$ it should be $t \leq 20$ (all) inequalities should start with 0 should start with 0 Not acceptable examples $10 < t \leq 20$ is wrong the numbers have been added wrong	

Paper 1MA1: 3H				
Question	Working	Answer	Mark	Notes
1 (a)		Venn Diagram	B1 M1 M1 C1	for labels on diagram for just 15 in the intersection for just 5 and 25 in only set B or just 3, 9, 21 and 27 in only set A or just 1, 7, 11, 13, 17, 19, 23, 29 in $(A \cup B)'$ for all numbers correctly placed in the Venn Diagram Ignore all entries except the region you are marking for each method mark
(b)		$\frac{7}{15}$	P1 A1	fit for $\frac{7}{a}$ where $a \geq 7$ or $\frac{b}{15}$ where $b \leq 15$ fit $\frac{7}{15}$ oe
2		$x = -\frac{2}{3}$ $y = -2$	M1 M1 A1	for a method to eliminate one variable (condone one arithmetic error) (dep) for substituting found value in one of the equations or appropriate method after starting again (condone one arithmetic error) $x = -\frac{2}{3}$ oe and $y = -2$
3 (a)		12	B1	cao
(b)		Explanation	C1	No with statement about not being mutually exclusive events eg a person could be in both categories



Paper: 1MA1/1H				
Question	Working	Answer	Mark	Notes
5		70.5	P1 P1 P1 P1 A1	starts process of Pythagoras e.g. $5^2 + 12^2$ complete process for Pythagoras e.g. $\sqrt{5^2 + 12^2}$ or $\sqrt{25 + 144}$ or $\sqrt{169}$ (=13) (dep P1 for Pythagoras) process of adding all the lengths e.g. $5 + 5 + 12 + 12 + "13"$ (=47) (indep) process of multiplying at least 2 lengths by 1.5 cao SC: any evidence of working with Pythagoras award the P1 or P2
6		comparison	M1 A1	starts to manipulate expression e.g. $3y = 9x - 6$ or $3y = 9x - 5$ gives equation(s) which can be used to show that the gradients of the two lines are the same e.g. $y = 3x - 5/3$
7		72	P1 P1 A1	for showing the process of 30×60 (=1800) or 20×54 (=1080) (dep P1) for showing the complete process e.g. (" 1800 " – " 1080 ") $\div$ 10 concluding the answer is 72 (and not 66)
8 (a) (b)		0.00000797 6.3×10^7	B1 M1 A1	cao for partial calculation involving powers of 10 e.g. $0.63 \times 10^{5-3}$ or 6.3×10^n where $n \neq 7$ or for $n \times 10^8$ or for 63000000 cao
9		500	M1 A1	recognition of 1.2 or 120% oe eg $600 \div 1.2$ oe or $x \times 1.2 = 600$ oe or $120\% = 600$ cao
10		$x^3 + 6x^2 + 11x + 6$	M1 M1 A1	for method to find the product of any two linear expressions (3 correct terms) e.g. $x^2 + x + 2x + 2$ or $x^2 + 2x + 3x + 6$ or $x^2 + x + 3x + 3$ for method of multiplying out remaining products, half of which are correct (ft their first product) e.g. $x^3 + x^2 + 2x^2 + 3x^2 + 2x + 3x + 6x + 6$ cao

Paper: 1MA1/3H				
Question	Working	Answer	Mark	Notes
1 (a) (b)		$160 < h \leq 170$ Line segments joining the points (135, 4), (145, 11), (155, 24), (165, 22) and (175, 19)	B1 C2 [C1]	correct class interval for fully correct frequency polygon for points plotted correctly at midpoints of intervals OR joining points with line segments at the correct heights and consistent within the intervals (including end values) OR correct frequency polygon with one point incorrect OR correct frequency polygon with first and last point joined] NB: ignore any histogram drawn and any part of frequency polygon outside range of first and last points plotted
2		New York (supported)	P1 P1 C1	for changing between £ and \$, eg $1.089 \times 1.46 (= 1.58(9.))$ or $2.83 \div 1.46 (= 1.93(8.))$ or between litres and gallons, eg $1.089 \times 3.785 (= 4.12(1.))$ or $2.83 \div 3.785 (= 0.74(7.))$ for a complete process to give values that can be used for comparison, eg " $1.938... \div 3.785 (= 0.51(2.))$ " or " $1.589... \times 3.785 (= 6.01(7.))$ " or $1.089 \times 3.785 (= 4.12(1.))$ and $2.83 \div 1.46 (= 1.93(8.))$ for New York and correct comparative values
3		648	M2 [M1 A1]	a complete method, eg $12.5 \times 1000 \div 19.3$ for using volume = mass/density, eg $12500 \div 19.3$ (condone inconsistent units or incorrect conversions) may be implied by digits 647... or 648...] for answer in range 647 to 648

Paper: 1MA1/3H				
Question	Answer	Mark	Mark scheme	Additional guidance
3 (a)	$40 < h \leq 50$	B1	accept 40 – 50 oe	
(b)	polygon drawn (15,7), (25,13) (35,14), (45,12) (55,16), (65,18)	B2 (B1)	for fully correct polygon with points plotted at the midpoints for points plotted correctly but not joined by straight lines or joining points at correct heights consistently within intervals including plotting at end values or correct frequency polygon with one point incorrect or correct frequency polygon with first and last points joined directly)	Joining must be with line segments for example, at 10, 20, 30,...or at 20, 30, 40,... Ignore any histogram drawn and any part of frequency polygon outside range of first and last points plotted

Paper: 1MA1/1H				
Question	Answer	Mark	Mark scheme	Additional guidance
5	93	M1 M1 M1 A1	for method to find angle ACB , eg. $180 - 75 - 51 (= 54)$ (dep M1) for method to use the ratio, eg. $"54" \div (2 + 1) (= 18)$ for complete method, eg. $180 - 51 - "18" \times 2$ or $75 + "18"$ o cao	Angles may be shown on diagram but must not be ambiguous eg. M0 for angle of 54° shown in the wrong place
6	No (supported)	P1 P1 C1	for process to find total weight of the 4 red bricks, eg. $5 \times 4 (= 20)$ or for process to find total weight of the 5 blue bricks eg. $9 \times 5 (= 45)$ for process to find total weight of all 10 bricks, eg. $"20" + "45" + 6 (= 71)$ No with correct supporting evidence Acceptable examples No, it is 7.1 She is wrong, it is 0.1 more No, (the total weight is) 71 not 70 Not acceptable examples Yes No, it is 71	May be seen next to statements 20 must be clearly referenced to the red bricks. $5 + 9 + 6 = 20$ gets no marks Candidates working in grams will need to give 7100 and 7000 for example as comparable figures



Paper: 1MA1/3H														
Question	Answer	Mark	Mark scheme	Additional guidance										
4	18.6	M1	for finding 4 products within intervals (including end points)	<table><tr><td>Min fx</td><td>Max fx</td></tr><tr><td>5</td><td>10</td></tr><tr><td>20</td><td>30</td></tr><tr><td>105</td><td>140</td></tr><tr><td>160</td><td>200</td></tr></table>	Min fx	Max fx	5	10	20	30	105	140	160	200
		Min fx	Max fx											
		5	10											
20	30													
105	140													
160	200													
M1	for $\Sigma“fx” \div (1 + 2 + 7 + 8)$ or $(7.5 \times 1 + 12.5 \times 2 + 17.5 \times 7 + 22.5 \times 8) \div (1 + 2 + 7 + 8)$ or $(“7.5” + “25” + “122.5” + “180”) \div “18”$ or $“335” \div “18”$	$\Sigma“fx”$ must come from 4 products fx within intervals (including end points)												
A1	for 18.6(111...)													
5	37 000	B1	cao											
6	50	B1	for finding the time difference, eg, 1hr 18 mins or 78 mins oe	Allow 1.18 for this mark 118 scores B0										
		P1	for correct process to convert minutes to hours, eg $18 \div 60 (=0.3)$ or $78 \div 60 (=1.3)$ or for a correct process to convert speed in miles per minute to mph eg $“0.833...” \times 60$	For a conversion of time or speed										
		P1	for using speed = distance $\div$ time eg, $65 \div [\text{time}]$ or $65 \div 78 (=0.833..)$	[time] is what the candidate clearly indicates as time difference										
		A1	cao SCB2 for 83(.333...) seen as the answer											



Paper: IMA1/3H				
Question	Answer	Mark	Mark scheme	Additional guidance
5	(a)			
	(b)			
6	(a)			
	(b)			
7				

Paper: 1MA1/1H																
Question	Answer	Mark	Mark scheme	Additional guidance												
8	19	M1	for a method to find 5 products within intervals (including end points)	<table><tr><td>Min fx</td><td>Max fx</td></tr><tr><td>0</td><td>80</td></tr><tr><td>100</td><td>200</td></tr><tr><td>140</td><td>210</td></tr><tr><td>60</td><td>80</td></tr><tr><td>120</td><td>150</td></tr></table>	Min fx	Max fx	0	80	100	200	140	210	60	80	120	150
		Min fx	Max fx													
		0	80													
100	200															
140	210															
60	80															
120	150															
M1	for $\Sigma "fx" \div (8 + 10 + 7 + 2 + 3)$ or $(5 \times 8 + 15 \times 10 + 25 \times 7 + 35 \times 2 + 45 \times 3) \div (8 + 10 + 7 + 2 + 3)$ or $("40" + "150" + "175" + "70" + "135") \div "30"$ or $"570" \div "30"$	$\Sigma "fx"$ must come from 5 products fx within intervals (including end points)														
A1	cao															
9	278	P1	for working out at least 3 areas from $5 \times 7 (= 35)$ $5 \times 6 (= 30)$ $7 \times 6 (= 42)$ $4 \times 4 (= 16)$													
		P1	for a complete process, eg $"35" \times 2 + "30" \times 2 + "42" + ("42" - "16") + "16" \times 5$ oe or $"35" \times 2 + "30" \times 2 + "42" \times 2 + "16" \times 4$ OR for a process to find the total surface area of at least 5 faces for each solid, eg $"35" \times 2 + "30" \times 2 + "42"$ and $"16" \times 6$ or $"35" \times 2 + "30" \times 2 + "42" \times 2$ and $"16" \times 5$	Total surface area of cuboid = 214 Total surface area of cube = 96												
		A1	cao													



Paper: 1MA1/3H					
Question	Answer	Mark	Mark scheme	Additional guidance	
6	(a)	0.7	B1	for 0.7 on the first branch	Accept equivalent fractions or percentages for probabilities
		0.65, 0.65	B1	for 0.65, 0.65 on the second branches	
	(b)	0.105	M1	for 0.3×0.35	
			A1	oe	
7	(a)	0.008	B1	for 0.008 or 8×10^{-3}	May be awarded at any stage
	(b)	50	M1	for conversion from km to m eg $180 \div 1000$ (= 180 000) or for conversion from hours to seconds eg $180 \div (60 \times 60)$ (= 0.05) or for conversion from km per hour to metres per second, eg $1000 \div (60 \times 60)$ (= 0.277...) (Accept $(60 \times 60) \div 1000$ (= 3.6))	
			M1	for a complete process eg $180 \times 1000 \div 3600$	
			A1	cao	
8		158	P1	for a first step in the process eg 50×167.6 (= 8380) or 20×182 (= 3640)	
			P1	for a complete process eg $(50 \times 167.6 - 20 \times 182) \div 30$ or $\frac{8380 - 3640}{30}$ or $4740 \div 30$	
			A1	cao	



Paper: 1MA1/1H				
Question	Answer	Mark	Mark scheme	Additional guidance
8	2.8	M1	for $8 \times 2.5 (= 20)$ or $3 \times 2 (= 6)$	
		M1	for a complete method eg $(-20) - (-6) \div 5$	
		A1	for 2.8 or $2\frac{4}{5}$ or mixed number	
9	30	B1	cao	
10	$x = 3$ $y = -4$	M1	for a correct method to eliminate either variable or rearrangement of one equation leading to substitution (condone one arithmetic error)	
		A1	for either $x = 3$ or $y = -4$	
		M1	(dep M1) for a correct substitution of found value into one of the equations or a correct method leading to the second value (condone one arithmetic error)	
		A1	for $x = 3$ and $y = -4$ NB Trial and improvement methods score 0 marks unless both x and y are correct	



Paper: 1MA1/1H						
Question	Working	Answer	Mark	Notes		
4		Daisy is wrong (supported)	P1 P1 A1 C1	for process to find area of any relevant circle ie $\pi \times 4^2 (=16\pi)$, $\pi \times 7^2 (=49\pi)$, $\pi \times 10^2 (=100\pi)$ or 7^2 and 4^2 for completed method to find shaded area eg “ $\pi \times 7^2$ ” – “ $\pi \times 4^2$ ” ($=33\pi$) or use of radii eg $7^2 - 4^2 (=33)$ for 2 comparable figures, eg 33π and 100π or 33 and 100 or 103 to 103.7 and 314 to 314.2 or 103 to 103.7 and 104.6 to 104.8 statement eg No because it should be $\frac{33}{100}$ and their accurate figures Allow use of $\pi = 3$ or better		
5	(a)	365	M1	$\bar{fx}$ with x consistent within intervals eg 200×1 , 300×11 , 400×5 , 500×0 , 600×3 , if 200, 3300, 2000, 0, 1800 are seen without working then condone 1 error (dep) $\Sigma \bar{fx} \div \Sigma f$ eg “7300” $\div 20$		
	(b)	Comment	M1 A1 C1	cao for comment about outliers affecting mean		
6		Shows reasoning to reach $y=3$	M1 M1 M1 A1	forms equation eg $2x + 6 = 5x - 9$ isolates x and number terms $3x = 15$ substitutes “5” into side length eg $2 \times 5 + 6 (=16)$ $48 \div 16 = 3$ or $16 \div 3 = 48$	$48 \div 3 (=16)$ forms equation $2x + 6 = “16”$ or $5x - 9 = “16”$ isolates x and number terms $2x = “10”$ or $5x = “25”$ shows $x=5$ for both solutions	$3(2x + 6) = 48$ or $3(5x - 9) = 48$, condone missing bracket Isolates x and number terms $6x = “30”$ or $15x = “75”$ forms the second equation $x=5$ from 2 different equations.



Paper: 1MA1/1H				
Question	Answer	Mark	Mark scheme	Additional guidance
4 (a)	3.5	P1	for a process to find the total length of the 5 sticks, eg $4.2 \times 5 (= 21)$ or for forming an equation, eg $\frac{7 + 4x}{5} = 4.2$	If figures are given as part of the answer they must be correct, but can allow ft
		P1	for complete process to find the mean eg $(“21” - 7) \div 4$	
		A1	oe	
(b)	Explanation	C1	for explanation Acceptable examples it reduced the mean my answer will be less the answer will be 1 it will be 2.5 less Not acceptable examples the mean will be more my answer will change it would decrease the lengths of the other sticks	
5	Angle constructed	C2 (C1	for fully correct construction with all arcs drawn for line drawn within guidelines with no (or incorrect) construction arcs or correct arcs drawn and no line seen)	Full marks cannot be awarded if no construction lines are seen



Paper: 1MA1/3H																
Question	Answer	Mark	Mark scheme	Additional guidance												
1 (a)	4.68×10^5	B1	cao													
	0.000 503 7	B1	cao													
2	80	M1	for complete method, eg 200×0.4 or for $\frac{80}{200}$ for the answer													
		A1	cao													
3 (a)	24.6	M1	for finding 5 products within intervals (including end points) with not more than one error, may be seen near table. eg $2 \times 12.5 (= 25)$, $8 \times 17.5 (= 140)$, $13 \times 22.5 (= 292.5)$, $21 \times 27.5 (= 577.5)$, $6 \times 32.5 (= 195)$ or for 1230	<table><tr><td>Min fx</td><td>Max fx</td></tr><tr><td>20</td><td>30</td></tr><tr><td>120</td><td>160</td></tr><tr><td>260</td><td>325</td></tr><tr><td>525</td><td>630</td></tr><tr><td>180</td><td>210</td></tr></table>	Min fx	Max fx	20	30	120	160	260	325	525	630	180	210
				Min fx	Max fx											
				20	30											
				120	160											
260	325															
525	630															
180	210															
M1	for $\Sigma fx \div \Sigma f$ eg $(\text{"25"} + \text{"140"} + \text{"292.5"} + \text{"577.5"} + \text{"195"}) \div \text{"50"}$ or $\text{"1230"} \div \text{"50"}$	Σfx must come from 5 products, fx within intervals (including end points)														
			A1	for 24.6 oe												

Paper: 1MA1/3H				
Question	Answer	Mark	Mark scheme	Additional guidance
(b)	No, with reason	C1	for No and reason Acceptable examples No, the median is in the interval $25 < T \leq 30$ No, the median is in the group containing the 25(.5)th temperature No, she did not take into account frequency No, the frequencies are not the same for each group. Not acceptable examples No, the median is 27.5 No, the median is higher than 22.5 $25 < T \leq 30$ Yes, ...	Any incorrect statement as part of a correct response can be ignored unless it contradicts the statement.
4 (a)	Explanations	C2	for two different correct explanations Acceptable examples She should have a solid/full/shaded/coloured circle at 4 It does not show that x could be equal to 4 She should have marked/drawn a (clear/empty) circle at -3 The line should be drawn to -3 Jenna started from -2 not -3 Not acceptable examples Both circles should be black One circle should be filled in (needs to say which circle) She shouldn't have to reach number 4 Jenna has made no mistakes	Any incorrect statement as part of a correct response can be ignored unless it contradicts the statement,
		(C1	for one correct mistake described)	

Paper: 1MA1/2H				
Question	Answer	Mark	Mark scheme	Additional guidance
6	370	P1	for finding the mean of list A, eg $(276 + 400 + 157 + 139) \div 4 (= 243)$ OR an expression for the mean of list B, eg $(530 + 500 + 270 + x + 440 + 320) \div 6 \left(= \frac{2060 + x}{6} \right)$ oe	
		P1	for beginning to work with ratio, eg "243" $\div 3 (= 81)$ or $[A] \div 3$ or "243" $\times 5 (= 1215)$ or $[A] \times 5$ OR " $\left(\frac{2060 + x}{6} \right) \times 3$ or $[B] \times 3$ or " $\left(\frac{2060 + x}{6} \right) \div 5$ or $[B] \div 5$ "	[A] is what they believe to be the mean of A [B] must be clearly their mean of B and be an expression including x
		P1	for completing the work with ratio, eg "81" $\times 5 (= 405)$ or $[A] \div 3 \times 5$ or $[B] \times 3 \div 5$ or " $\left(\frac{2060 + x}{6} \right) \times \frac{3}{5}$ " OR forms a suitable equation, eg "243" $\times 5 = 3 \times \left(\frac{2060 + x}{6} \right)$ or $[A] \times 5 = 3 \times \left(\frac{2060 + x}{6} \right)$	
		P1	for working with mean of list B, eg "405" $\times 6 (= 2430)$ or $[A] \div 3 \times 5 \times 6$ OR for process to remove brackets and denominator, eg "243" $\times 5 \times 2 = "2060 + x"$ or $[A] \times 5 \times 2 = "2060 + x"$ or $2060 + x = "405" \times 6$	
		A1	cao	

Paper: 1MA1/3H				
Question	Answer	Mark	Mark scheme	Additional guidance
7	Diagram drawn	B2 (B1)	for correct frequency polygon for points plotted at correct midpoints of intervals or joining points at correct heights consistently within intervals including plotting at end values or correct frequency polygon with one point incorrect or correct frequency polygon with first and last points joined directly)	Plotting at (5,14), (15,18), (25,26), (35,12) Must use line segments for B2 Joining must be with line segments NB ignore any histogram drawn and any part of frequency polygon outside range of first and last points plotted
8	8	P1 P1 P1 P1 A1	process to start the problem eg $xy = 45$ and $xz = 15$ and $yz = 27$ or $5 \times 9 (=45)$ and $3 \times 9 (=27)$ and $3 \times 5 (=15)$ or 3, 5 and 9 stated for $3 \times 5 \times 9 (=135)$ or 2 of “9” $\div 2.5 (=3.6)$ or “5” $\div 2.5 (=2)$ or “3” $\div 2.5 (=1.2)$ for $2.5^3 (=15.625)$ or all of “9” $\div 2.5 (=3.6)$ and “5” $\div 2.5 (=2)$ and “3” $\div 2.5 (=1.2)$ for a complete process to find the number of cubes possible eg [volume] $\div$ “15.625” (=8.64) or “3.6” $\times$ “2” $\times$ “1.2” (=8.64) cao	Maybe seen on diagram [Volume] must come from multiplying together what they clearly indicate as the 3 dimensions of the cuboid. The three dimensions cannot be 45, 27 and 15

Paper: 1MA1/3H				
Question	Answer	Mark	Mark scheme	Additional guidance
4	statement	B2	Two different statements Acceptable eg should be joined with straight lines (not curve)/should use a ruler 1 st (quarter) not shown/plotted/labelled/not all quarters labelled does not show all 4 seasons 9.5 missing from vertical axes/not linear vertical (number) axis does not start at 0/the y axis starts at 6 the graph does not begin at 0, it starts at 6 it is not clear what 2, 3, 4 on the x-axis mean the scale of years doesn't make sense there is lack of clarity about what the numbers on the x axis represent graph is curved line Not acceptable eg no value plotted for 2 in 2016 it does not start at 0 (no reference to vertical axis)/missing 0 they should not have connected the dots like that the numbers on the x axis are repeated the numbers along the x axis 2, 3, 4 the years on the x axis have not been written properly does not follow a sequence it needs a discontinuity wiggle on the axis no title	Ignore additional statements provided no contradiction
	statement	(B1	One statement eg from those above.)	

Paper: 1MA1/3H				
Question	Answer	Mark	Mark scheme	Additional guidance
5	40 missing from frequency scale Incorrect point (50, 5)	C2	Two different statements Acceptable eg (50, 5) / the last point is incorrect the last point should be at (45,5) the last point plotted was placed incorrectly for his last point he has plotted by the end of the data and for the rest he has plotted by the middle he did not use the midpoint, he used 50 instead of 45 40 missing (from vertical axis) vertical scale is not linear the frequency doesn't increase in the same intervals the vertical axis is not right Not acceptable eg the last point should be at (40, 5) bottom of the polygon should be connected he didn't start the graph at the origin he did not draw a polygon he has plotted the first 4 points at midpoint (C1 One acceptable statement)	Ignore additional statements provided no contradiction
6	10	P1 P1 P1 A1	for a process to use distance = speed × time for either of the parts of Jessica's journey, eg. $6 \times \frac{15}{60}$ (= 1.5) or $9 \times \frac{40}{60}$ (= 6) or 6×15 (= 90) or 9×40 (= 360) for a process to add the 2 distances for Jessica, eg $6 \times \frac{15}{60} + 9 \times \frac{40}{60}$ (= 7.5) or $6 \times 15 + 9 \times 40$ (= 450) for complete process to find Amy's average speed, eg. "7.5" ÷ "0.75" oe or "450" ÷ 45 cao	Must be consistent units at this stage.



Paper: 1MA1/3H				
Question	Answer	Mark	Mark scheme	Additional guidance
1	Points plotted at (130, 12) (150, 28) (170, 30) (190, 22) (210, 8) and joined with line segments	B2 (B1)	for correct plotting of 5 points and joining with line segments for points plotted correctly at midpoints or for a frequency polygon with one point incorrect or for a frequency polygon with first and last point joined directly or for joining the points with line segments at the correct heights consistent within intervals (including end points))	Ignore any histogram drawn Ignore any part of the frequency polygon outside of the range of the first and last point plotted. for example, at 120, 140, 160, 180, 200 or at 140, 160, 180, 200, 220
2 (a)	340 200	B1	cao	
(b)	8.026×10^{-1}	B1	cao	
3	Drawn	B2 (B1)	for a correct construction with all relevant arcs drawn for all relevant arcs drawn or for a bisector within guidelines but with no or insufficient arcs)	
4 (a)	(0.3) 0.7 0.3 0.7 0.3 0.7	B2 (B1)	all probabilities correctly placed for 0.7 correctly placed for Game 1)	Accept equivalent fractions or percentages for probabilities
(b)	0.49	M1 A1	for a correct method, ft their tree diagram eg 0.7×0.7 only oe, ft their tree diagram	ft their diagram provided probabilities are less than 1 An answer of $\frac{0.49}{1}$ scores M1A0 unless 0.49 seen





Paper: 1MA1/2H				
Question	Working	Answer	Mark	Notes
9		65.60	P1 P1 A1	for start in using inverse proportionality, eg $5 \times 4.5 (= 22.5)$ or $4.5 = \frac{k}{5}$ or $5 \times 4.5 \times 60 (= 1350)$ or $\frac{5}{3}$ or $\frac{3}{5}$ for process to find number of hours for each cleaner today, eg $\frac{22.5}{3} (= 7.5)$ for 65.6(0) (SC B2 for 61.5(0))
10 (a)		0 to 20 seconds	B1	for between 0 seconds and 20 seconds
		with reason	C1	for reason given eg gradient is greatest oe
(b)		18	B1	ft from (a)
11		0.119	P1 P1 A1	for starting the process, eg finds area 25π or 16π oe, or finds angle for town A, $0 - 19 (70^\circ)$, may be on diagram for a complete process, eg $\frac{70}{360} \times \frac{25\pi}{41\pi}$ $0.118 - 0.119$ or $11.8\% - 11.9\%$



Paper: 1MA1/1H				
Question	Answer	Mark	Mark scheme	Additional guidance
7	20 or 24 or 168	B1	for identification of the range of the girls (20) or the range (24) or the median (168) of the boys	
	Comparison	C2	for a correct comparison of medians and a correct comparison of ranges supported by correct figures eg the median height for girls (165) is less than the median height for boys (168) and the range for girls (20) is less than the range for boys (24) At least one comparison must be in context referring to height or quoting cm.	Simply quoting values for median, range is insufficient; they must be compared.
		(C1	for a correct comparison of medians or a correct comparison of ranges that could fit their incorrect figure(s))	Context not necessary for C1
8	450	M1	for $18 \div 3 (=6)$	Ignore units
		M1	for substitution eg. $75 = \frac{F}{"6"}$ or $75 \times "6"$	
		A1	cao	
9	0.000 672, 67.2×10^{-4} 6.72×10^5 672×10^4	B2	cao	Accept correct numbers in any form
		(B1	for correct conversions to same format, condoning one error or for 3 numbers in the correct order (ignoring one) or for all 4 numbers listed in reverse order)	



Paper: 1MA1/3H				
Question	Answer	Mark	Mark scheme	Additional guidance
6	Comparison	B1	for correctly identifying the median of (School) A as 57	If median for school B is stated in the comparison it must be correct If range for school B is stated in the comparison it must be correct
		C1	(ft, dep on value for the median being stated) for making a correct comparison of <u>median</u> eg 'the median of (School) A is higher than the median of (School) B'	
		B1	for correctly identifying the range of (School) A as 49	
		C1	(ft, dep on value for the range being stated) for making a correct comparison of <u>range</u> eg 'the range of (School) A is higher than the range of (School) B'	
7	10.2 and 10.3	B1	for 10.2 in the correct place	Accept 10.29 or 10.299(99...)
		B1	for 10.3 in the correct place	
8	14.3	M1	for a correct statement for AB using trigonometry, eg $\tan 62 = \frac{AB}{7.6}$ or $(AB =) 7.6 \times \tan 62$	If an answer is given in the range in working and then rounded incorrectly award full marks
		A1	answer in the range 14.28 to 14.3	
9	(a) $14x^5y^6$	B2	cao	Where a, x^b, y^c can be made up of two products Condone inclusion of multiplication signs for B1
		(B1)	for correct simplification of two terms ax^5y^6 or $14x^by^6$ or $14x^5y^c$ where $a \neq 14, b \neq 5, c \neq 6$	
	(b) m^{-6}	B1	for m^{-6} or $\frac{1}{m^6}$	

Paper: 1MA1/3H				
Question	Answer	Mark	Mark scheme	Additional guidance
4 (a)	5	M1	"2" $\div 40 \times 100$	"2" comes from their reading of the height of the 20 to 24 column
		A1	cao	
	9.5 shown	M1	for frequencies of 11, 8, 13, 6 and 2 (allow one error) or for midpoints 2, 7, 12, 17 and 22	May be seen on chart
		M1	for finding at least 4 products fx consistently within interval (including end points)	
		M1	for $\Sigma fx \div ("11" + "8" + "13" + "6" + "2")$ or $(11 \times 2 + 8 \times 7 + 13 \times 12 + 6 \times 17 + 2 \times 22) \div 40$ or $\Sigma fx (=380)$ and $9.5 \times ("11" + "8" + "13" + "6" + "2") (=380)$	
		C1	for correct figures showing the answer or accurate figures to compare from correct working eg 380 from two calculations	Evidence of two different calculations that should lead to 380 are required for this mark

Paper: 1MA1/2H				
Question	Answer	Mark	Mark scheme	Additional guidance
2	statements	C1	for lobf incorrect Acceptable examples lobf lobf does not suit all points/not a lobf lobf wrong since hits x axis/is inaccurate/should be amongst the crosses lobf goes through the origin/through one point Not acceptable examples no correlation/there is no title	
		C1	for height scale not linear Acceptable examples 150 missing Height not linear / Height numbers going up wrong Not acceptable examples 150 graph does not start at 140/graph does not start at 0 height should start at 170	



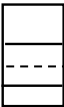
Paper: 1MA1/3H				
Question	Answer	Mark	Mark scheme	Additional guidance
1 (a)	$x^2 - 4x - 45$	M1	for 3 of 4 terms correct or 4 terms correct ignoring signs	3 terms correct can be implied, eg $x^2 - 4x + c$
		A1	cao	
(b)	$3x(3x + 2)$	B2	for $3x(3x + 2)$	
		(B1	for $3(3x^2 + 2x)$ or $x(9x + 6)$ or $3x(ax + b)$ where a and b are integers or $(3x + 2)$ as a factor)	
2 (a)	157.668(255)	M1	for 836.4 or 5.304(809139) or 28.141 or a truncated or rounded version of 157.668255 to no less than 3 sf	Answer must be given to at least 3 decimal places rounded or truncated Accept a clear indication of the decimal point. Check first 3 decimal places only
		A1	for 157.668(255)	
(b)	157.7	B1	ft from part (a) provided answer to (a) has at least 5 sf	
3	35 to 42	M1	for drawing a suitable line of best fit or for a line from $x = 34$ or for a point marked on the grid at $(34, y)$, y in the range 33 to 44	Line at $x = 34$ does not have to be full length of grid but should be in or reach the data set. Acceptable values for the data set are $y = 33$ to $y = 44$
		A1	answer in the range 35 to 42	

Paper: 1MA1/3H				
Question	Answer	Mark	Mark scheme	Additional guidance
1 (a)	negative	B1	cao	Ignore any description of a relationship and any reference to strength of correlation
(b)	Explanation	C1	for a correct explanation, eg “not in line with the trend of the other points” “does not fit in with the correlation” “is far away from the other points or line of best fit”	
(c)	Comment	C1	for an explanation eg “point would be outside of the range of the scatter diagram”	
2	$9p + 13$	M1 A1	for method to expand one bracket, eg $5 \times p + 5 \times 3 (= 5p + 15)$ or $2 \times 1 - 2 \times 2p (= 2 - 4p)$ or $-2 \times 1 - 2 \times -2p (= -2 + 4p)$ cao	If an attempt is made to multiply by -2 in the second brackets then it must be done consistently.
3	Triangle of area 18	M1 A1	for a complete method to find area of trapezium eg $\frac{1}{2}(2 + 7) \times 4 (= 18)$ OR for a triangle drawn of area 36 OR for a triangle that would give an area ft their area of trapezium for a triangle drawn of area 18 eg base = 6, height = 6 or base = 9, height = 4	The value for the area of the trapezium must be clear for the ft to be checked. Accept use of dimensions that are not whole numbers as long as the intention is clear

Paper: 1MA1/1H				
Question	Answer	Mark	Mark scheme	Additional guidance
6	(a) Description	C1	for a valid description of the relationship Acceptable examples As age increases, weight increases The older you are the greater the weight Positive correlation Not acceptable examples Positive (relationship) age and weight are in proportion strong correlation or correlation is increasing as the babies get older the heavier they get, negative correlation they are directly proportional, weight goes up as age goes up	Accept positive correlation Ignore any comment about strength
	(b) 2.5 to 4.5	B2 (B1	for an answer in the range 2.5 to 4.5 for a suitable line of best fit drawn or for a point on the grid at (x, 5.8) where x lies between 2.5 and 4.5 or a horizontal line drawn from 5.8 across to (x, 5.8) where x is in the range 2.5 to 4.5)	
7	1200	M1	for a fully correct method, eg $240 \div 0.2$ or 240×5 oe	
		A1	cao SC B1 for an answer of 960 or 1440 if M0 scored	
8	3	P1	for process to find area of base, eg $1200 \div 40 (= 30)$	
		P1	for process to find pressure, eg $90 \div "30"$	
		A1	cao	

Paper: 1MA1/2H				
Question	Answer	Mark	Mark scheme	Additional guidance
1	4.643(069317)	M1 A1	for 192.6 or 8.934 or 21.558(09268) or answer of 4.64 or digits 4643... for 4.643(069317)	Answer must be given to at least 3 decimal places rounded or truncated Check first 3 decimal places only If given to 3 dp or better ignore subsequent rounding
2 (a)	positive	C1	cao	Ignore any description of a relationship and any reference to strength of correlation
(b)	lobf drawn	C1	for straight line passing between (140, 20) and (140, 22.5) and between (220, 30) and (220, 32.5)	
(c)	26.5 – 29.5	C1	for answer in range 26.5 – 29.5 or ft single line with positive gradient	

Paper: 1MA1/3H				
Question	Answer	Mark	Mark scheme	Additional guidance
1 (a)	(100,18)	B1	cao	
(b)	12.8 to 14.8	M1	for a method to read off eg line of best fit or line up from 370 or for a point on the grid at (370, y) where y lies between 12.8 and 14.8	
		A1	for an answer in the range 12.8 to 14.8	
(c)	Decision and statement	C1	for decision and statement Acceptable examples No, as this point can be disregarded from the general trend No, ignore this point No, the correlation is positive No, because even with an outlier you can still have a negative or positive correlation. No, there is still a correlation. No, as you can use the rest of the data to determine a correlation. No, as outlier does not affect the majority No as a line of best fit can still be drawn No, it is an anomaly Not acceptable examples Yes, ... Outliers can be ignored [no decision] No, the outlier can be ignored so the correlation is negative No there are other things that can affect the test	

Paper: 1MA1/2H					
Question	Answer	Mark	Mark scheme	Additional guidance	
1	(a)	(2, 1)	B1	cao	Accept negative correlation Ignore any comment about strength Any numbers used in the description must be within tolerance
	(b)	Description	C1	correct description, eg as the amount of rainfall decreases the number of hours of sunshine increases	
	(c)	3 to 4	M1 A1	for a suitable line of best fit drawn, or for a point marked at (x, 7), or a horizontal line drawn from 7 across to (x, 7) where x is in the range 2.5 to 4 answer in the range 3 to 4	
2	Elevation	B2	fully correct side elevation 5 high and 3 wide		
		(B1)	for a rectangle 5 high and 3 wide or correct side elevation in the wrong orientation)		
3	(a)	$6n + 1$	B2 (B1)	oe for $6n + c$ where c is an integer $\neq 1$ or is missing)	2, -4, -10, -16, -22, -28, -34, -40, -46, -52 May stop at -58 or ring if sequence continues
	(b)	Shown with supportive working	M1	for $8 - 6n = -58$ or $8 - 6 \times 11$ ($= -58$) or starts to list terms of the sequence, with at least 3 correct or any other valid method.	
			A1	shown with working or an explanation , eg Yes and 11 or 2, -4, -10, -16, ..., -52, -58	

Paper: 1MA1/1H																																
Question	Working	Answer	Mark	Notes																												
1	(a)	10,19	B1	cao																												
	(b)	positive	C1	positive (correlation)																												
	(c)	12 to 13	M1	for an appropriate line of best fit drawn, or a point marked at (x, 16.4) or a horizontal line drawn from 16.4 across to (x, 16.4) where x is in the range 12 to 13																												
			A1	hours given in the range 12 to 13																												
	(d)	explanation	C1	(yes) e.g. as the majority of points for high temperature appear when there are more hours of sunshine (positive correlation)																												
2		2×2×2×7	M1	for complete method to find prime factors; could be shown on a complete factor tree with no more than 1 arithmetic error																												
			A1	accept 2 ³ × 7																												
3	21840 1638 23478 <table><tr><td></td><td>5</td><td>4</td><td>6</td></tr><tr><td>2</td><td>2</td><td>0</td><td>1</td></tr><tr><td>3</td><td>1</td><td>5</td><td>2</td></tr><tr><td></td><td>4</td><td>7</td><td>8</td></tr></table> <table><tr><td></td><td>500</td><td>40</td><td>6</td></tr><tr><td>40</td><td>20000</td><td>1600</td><td>240</td></tr><tr><td>3</td><td>1500</td><td>120</td><td>18</td></tr></table> 20000 + 1600 + 240 + 1500 + 120 + 18 = 23478		5	4	6	2	2	0	1	3	1	5	2		4	7	8		500	40	6	40	20000	1600	240	3	1500	120	18	234.78	M1	for complete method with relative place value correct including addition of all the appropriate elements of the calculation e.g. two lines of 1 st method, internal numbers of grids, or complete structure shown of partitioning methods
	5	4	6																													
2	2	0	1																													
3	1	5	2																													
	4	7	8																													
	500	40	6																													
40	20000	1600	240																													
3	1500	120	18																													
			A1	for digits 23478																												
			A1	(ft dep M1) for correct placement of the decimal point into their final answer																												
4		x ² + 6x = 1	M1	writes the area using algebraic terms e.g. (x + 3) × (x + 3) or at least two correct area expressions which may be written on the diagram or x given as √10 – 3																												
			M1	expands and includes the given 10 e.g. x ² + 3x + 3x + 9 = 10; condone one error in the four terms when expanding or 10 – 3√10 – 3√10 + 9 + 6√10 – 18 (=1) condone 1 error in the 6 terms																												
			A1	rearranges to give the given equation or shows surd expression simplifies to 1																												

Paper: 1MA1/2H				
Question	Working	Answer	Mark	Notes
6		Secure Bank (supported)	P1 P1 C1	for a process to work out the interest after one year e.g. $0.02 \times 25000 (=500)$ or $0.043 \times 25000 (=1075)$ or for 1.02 or 25500 or 1.043 or 26075 for process to find value of the investment after 3 years or the multiplicative factor for 3 years at one of the banks, e.g. $25000 \times 1.02 \times 1.02 \times 1.02$ oe ($= 26530\dots$) or $1.02^3 (= 1.0612\dots)$ or $25000 \times 1.043 \times 1.009 \times 1.009$ oe ($= 26546\dots$) or $1.043 \times 1.009 \times 1.009 (= 1.0618\dots)$ [accept total interest of 1530.. or 1546.. if final values of investment are not found] for Secure Bank from correct figures, eg. 26530.. and 26546.. or 1530... and 1546... or 1.0612... and 1.0618...
7		$4.755 \leq n < 4.765$	B2 [B1]	for $4.755 \leq n < 4.765$ for 4.755 or 4.765 or 4.7649]
8		12	M1 A1	for evidence of taking a reading from the graph from $h = 160$ for answer in the range 11.8 to 12.2
9		No (supported)	M2 [M1 C1 M2 C1]	for the correct position of C or E for a correct position of B or D] for No with correct supporting evidence, eg. showing C and E in the correct positions OR for C is a rotation of 90° anticlockwise about O or E is a rotation of 90° clockwise about O for No with supporting evidence, eg. C is a rotation of 90° anticlockwise about O and E is a rotation of 90° clockwise about O.



Paper: 1MA1/2H				
Question	Answer	Mark	Mark scheme	Additional guidance
8 (a)	580	M1	for method to find value before increase eg $551 \div 0.95$	$6000 \times 1.024 \times 1.017^2$ scores M2 If correct answer is stated then subsequently rounded isw and award 3 marks If correct answer stated and then interest only given as the answer award M2A0
		A1	cao	
	6354.67	M1	for 6000×1.024 oe (= 6144)	
		M1	for “6144” $\times 1.017^2$ oe	
(b)		A1	for 6354.66 or 6354.67 or 6354.68	
9	Two changes	C1	plot the median at 162, not 161 oe	
		C1	plot the upper quartile at 171, not 172 oe Acceptable examples the median has been plotted at 161 / upper quartile at 172 the upper quartile should be 171 (not 172) UQ is wrong as IQR is 17 not 18 Not acceptable examples the median / upper quartile have been plotted / drawn wrong the upper quartile has been worked out incorrectly She needs to work out the UQ	

Paper: 1MA1/3H				
Question	Answer	Mark	Mark scheme	Additional guidance
13	Statements	C1 C1	Makes reference to the fact that the label on the horizontal axis is missing Makes reference to the fact that the graph has not been plotted at the top end of the class intervals, eg has plotted at midpoints	
14	(a) $81x^{20}y^{24}$ (b) $x^3+3x^2-10x-24$	B2 (B1 M1 M1 A1	cao for two of $81, x^{20}, y^{24}$) for method to find the product of any two linear expressions (3 out of 4 terms correct or 4 correct terms ignoring signs), eg $x^2 + 2x - 3x - 6$ or $x^2 + 2x + 4x + 8$ or $x^2 + 4x - 3x - 12$ for a complete method to find all terms, at least half of which are correct (ft their first product), eg $x^3 + 4x^2 + 2x^2 - 3x^2 + 8x - 6x - 12x - 24$ cao	Note that, for example $-x - 6$ in expansion of $(x + 2)(x - 3)$ is regarded as 3 correct terms. First product must be quadratic with at least 3 terms but need not be simplified or may be simplified incorrectly
15	Shown	M1 C1	for one correct product eg $7 \times 5 (= 35)$ or $13 \times 5 (= 65)$ or $7 \times 13 \times 5 (= 455)$ for showing three correct products added eg $35 + 65 + 455$	Ignore additional products There is no need to show the three products sum to 555



Paper: 1MA1/2H				
Question	Working	Answer	Mark	Notes
12 (a)		comment	C1	for comment e.g. incorrect denominator for the 2nd student or probabilities for 2 nd student do not add up to 1
(b)		No (supported)	C1	for "no" with supporting evidence, e.g. probabilities should be multiplied together or 0.4×0.25
13		7	P1 P1 A1	for correct process to find any frequency, eg. $"1.1" \times 10 (= 11)$ or $"2.8" \times 10 (= 28)$ or $"2.3" \times 20 (= 46)$ or $"1.4" \times 20 (= 28)$ or $"1.4" \times 10 (= 14)$ or $"0.7" \times 30 (= 21)$ or for a correct process to find the total area and an area of any block, eg. using $1 \text{ cm}^2 = 1$ unit of area to get 53.6 and one of 4.4, 11.2, 18.4, 11.2, 5.6, 8.4 (dep P1) for complete process to find 20% of $(\text{"1.4"} \times 10 + \text{"0.7"} \times 30)$, eg. $\frac{20}{100} \times "35"$ or $\frac{"5.6" + "8.4"}{"53.6"} \times 134 \times \frac{20}{100}$ cao
14		C, F, A, H	B3 [B2 [B1	for a fully correct table for 2 or 3 correct] for 1 correct]



Paper: 1MA1/2H				
Question	Answer	Mark	Mark scheme	Additional guidance
10	$k = 2m - y^2$	M1 A1	correct first step of showing an intention to square both sides with no algebraic ambiguity in any resulting statements, eg $y^2 = 2m - k$ for $k = 2m - y^2$	
11	(a) Explanation (b) Comparison	C1 C1	eg 'No' the median is 57 (ft) a correct comparison of medians eg the median weight for Megan was greater than the median weight for Amy a correct comparison of a measure of spread eg the interquartile range of weights for Megan was greater than the interquartile range of weights for Amy For the award of both marks at least one of the comparisons must be in the context of the question	Simply quoting values for median, range and IQR is insufficient, they must be compared Median Range IQR Megan 57 49 26 Amy 42 47 16 Figures given must be correct. Comparisons can relate to the range or the IQR
12	32.1	P1 P1 P1 A1	starts process, eg $\sin 40 = \frac{DB}{8.6}$ oe or for $8.6 \times \sin 40 (=5.52797\dots)$ complete process to find ED , eg $(8.6 \times \sin 40) \div 2 (=2.76\dots)$ process to find angle EAD , eg $\tan^{-1}\left(\frac{2.76\dots}{4.4}\right)$ or $\tan^{-1}("0.628\dots")$ answer in range 32.09 to 32.2	Accept values rounded or truncated to 2 dp. If an answer in the range is seen in working and then incorrectly rounded award full marks



Paper: 1MA1/2H				
Question	Answer	Mark	Mark scheme	Additional guidance
16	$\frac{52}{72}$	P1 P1 A1	for $\frac{4}{9} \times \frac{3}{8} \left(\frac{12}{72} \right)$ or $\frac{4}{9} \times \frac{5}{8}$ or $\frac{5}{9} \times \frac{4}{8} \left(\frac{20}{72} \right)$ for $1 - \left(\frac{5}{9} \times \frac{4}{8} \right)$ or $\frac{4}{9} \times \frac{3}{8} + \frac{4}{9} \times \frac{5}{8} + \frac{5}{9} \times \frac{4}{8}$ oe for $\frac{52}{72}$, $\frac{13}{18}$ oe SC B1 for answer of $\frac{56}{81}$ (replacement)	Accept equivalent fractions, decimals (0.72...) or percentages (72.22.....%)
17	61	B1 M1 A1	angle OAD = 90, may be marked on diagram method to work out angle OAB (=29) cao	Angle could be shown by a right-angle symbol Correct method can be implied from angles on the diagram if no ambiguity or contradiction. Reasons need not be given. Award 0 marks for an answer of 61 with no other working.
18	Bar of height 3.2	M1 M1 C1	method to find any frequency eg $1.2 \times 2.5 (=3)$ or $2 \times 2.5 (=5)$ or $2.8 \times 5 (=14)$ or $0.8 \times 12.5 (=10)$ or method to use areas eg $12 \times 5 (=60)$ or $20 \times 5 (=100)$ or $28 \times 10 (=280)$ or $8 \times 25 (=200)$ complete method to find total frequency for the four intervals eg "3" + "5" + "14" + "10" (=32) or "60" + "100" + "280" + "200" (=640) cao	Accept equivalent methods proportional to those shown



Paper: 1MA1/3H				
Question	Answer	Mark	Mark scheme	Additional guidance
11	0.1709	M1 M1 A1	for one product, 0.07×0.98 ($=0.0686$) or 0.93×0.11 ($=0.1023$) or 0.07×0.02 ($=0.0014$) or 0.93×0.89 ($=0.8277$) for a fully correct method, eg $0.07 \times 0.98 + 0.93 \times 0.11$ or $1 - (0.07 \times 0.02) - (0.93 \times 0.89)$ oe	If all products shown, award this mark
12	Box plot	M1 M1 A1	for correctly identifying one of the LQ (188), median (197) or UQ (209) from the stem leaf for showing a box and at least 3 correctly plotted values from 173, 188, 197, 209, 219 for a fully correct box plot	May be implied by one of these values being correctly plotted.
13	739	P1 P1 P1 A1	process to find the volume of C, eg $\pi \times 3^2 \times 25$ ($=706.8583471$ or 225π) process to find the volume of A or the volume of B, eg " $706.8\dots$ " $\times \frac{2}{2+13}$ ($=94.24777961$ or 30π) or " $706.8\dots$ " $\times \frac{13}{2+13}$ ($=612.6105675$ or 195π) or process to work with density and ratio, eg $(2 \times 1.21 + 13 \times 1.02)$ ($=15.68$) process to find the mass of C, eg " 30π " $\times 1.21$ ($=114.0398133$) + " 195π " $\times 1.02$ ($=624.8627788$) or " 225π " $\times$ " 15.68 " $\div (2+13)$ for an answer in the range 738.5 to 739	For use of 3.14 Volume of C is 706.5 Volume of A is 94.2 Volume of B is 612.3 Mass of A is 113.982 Mass of B is 624.546 Do not award accuracy mark if the figure is from obvious incorrect working

Paper: 1MA1/1H				
Question	Answer	Mark	Mark scheme	Additional guidance
11	$\frac{30w}{6-21w}$	P1 P1 P1 A1	for forming an equation, eg $6(2w + y) = 7w(3y + 6)$ or $12w + 6y = 21wy + 42w$ oe for expanding brackets correctly and gathering w terms or isolating y terms in a correct equation, eg $6y = 21wy + 30w$ or $6y - 21wy = 42w - 12w$ or $6y - 21wy = 30w$ (dep on two terms in y) for factorising out the y , eg $y(6 - 21w) = 42w - 12w$ or $y(6 - 21w) = 30w$ or $3y(2 - 7w) = 30w$ for $(y \Rightarrow) \frac{30w}{6-21w}$ oe	Condone missing brackets for this mark
12 (a)	cf graph	M1 A1	for 5 or 6 points plotted correctly for a fully correct graph SC B1 if 5 or 6 of their points plotted not at the end but consistent within each interval and joined by a curve or line segments providing no gradient is negative	If histograms drawn, points must be identified Accept a smooth curve or line segments Ignore to the left of the first point and right of the last point
(b)	13 to 14	B1	for answer in the range 13 to 14 or ft their cf graph	ft only from a cf graph

Paper: 1MA1/1H				
Question	Answer	Mark	Mark scheme	Additional guidance
13	$t = 20$ $p = 4, 50$	M1 M1 A1	for method to find a missing value of p , eg $\frac{100}{25}$ oe ($= 4$) or $\frac{100}{2}$ oe ($= 50$) or for $p = \frac{100}{t}$ for method to find the missing value of t , eg $100 \div \frac{5}{1}$ ($= 20$) or for finding both missing values of p cao	Marks for 4 or 50 can only be awarded if in correct cell of table or unambiguous in working Mark for 20 can only be awarded if in correct cell of table or unambiguous in working
14	Histogram drawn	B3 (B2) (B1)	for fully correct histogram, eg relative heights 1, 5, 6, 1.5 for 3 correct bars or for frequency $\div$ class interval for at least 3 frequencies and 2 correct bars of different widths) for 2 correct bars of different widths or for frequency $\div$ class interval for at least 3 frequencies)	Frequency densities are 1, 5, 6, 1.5
15	40	P1 P1 A1	for a start to the process, eg $\frac{x}{360} \times 2 \times \pi \times 18 (= 4\pi)$ oe or $\frac{4\pi}{2 \times \pi \times 18} (= \frac{x}{360})$ oe for a complete process to find x , eg $\frac{4\pi}{36\pi} \times 360$ oe cao	Any arrangement equivalent to this equation acceptable



Paper: 1MA1/2H				
Question	Answer	Mark	Mark scheme	Additional guidance
10	17500	P1 P1 A1	for a process to find the value at the end of year 1, eg $10914.75 \div 0.81 (= 13475)$ or $10914.75 \div 0.77 (= 14175)$ or for finding the combined multiplier, eg $0.77 \times 0.81 (= 0.6237)$ for a complete process to find the initial value, eg “ $13475 \div 0.77$ ” or “ $14175 \div 0.81$ ” or $10914.75 \div “0.6237”$ cao	
11	Box plot	B3 (B2) (B1	for fully correct box plot for box plot showing a box and at least 3 correctly plotted values from 24, 42, 54, 64, 96) for correctly identifying one of the LQ (42) Median (54) or UQ (64) from the CF graph)	Box can be of any height. Accept ends that are marked (eg line, cross, dot) or defined by the end of the whiskers if clear May be implied by one of these correct on the box plot
12 (a)	6	M1 A1	for an attempt to evaluate 1.13^n for at least one value of n (with $n > 1$) 6 years coming from finding n such that $1.13^n > 2$	1.13, 1.27..., 1.44..., 1.63..., 1.84..., 2.08... May be used with a value Values rounded or truncated to 2dp or better
(b)	Explanation	C1	for explanation Acceptable examples it will decrease the number of years will go down we can't tell (as we don't know how much it is increasing by) it will be an overestimate Not acceptable examples it will increase it will be an underestimate	

Paper: 1MA1/2H				
Question	Answer	Mark	Mark scheme	Additional guidance
9 (a)	Graph drawn through (30, 20), (40, 48), (50, 64), (60, 75), (70, 80)	M1	for 4 or 5 points plotted correctly from the cumulative frequency table	Ignore to the left of the first point and right of the last point If histograms drawn, points must be identified
		A1	for a fully correct graph SCB1 if 4 or 5 points plotted not at end but consistent within each interval and joined by a curve or line segments providing no gradient is negative	Accept a smooth curve or line segments
		B1	for answer in range 36 to 38 or ft their cf graph	
10 (a)	$\frac{225}{3600}$	P1	for process to use relative frequency for landing on a 6, eg $\frac{15}{60}$ oe	Accept any equivalent fraction, decimal form 0.06(25) or 0.062 or 0.063, percentage form 6(.25)% or 6.2% or 6.3% Ignore subsequent attempts to write the correct answer in a different form.
		P1	for $\frac{15}{60} \times \frac{15}{60}$ oe, eg $\frac{1}{4} \times \frac{1}{4}$	
		A1	for $\frac{225}{3600}$ oe, eg $\frac{1}{16}$	
(b)	Explanation	C1	for a correct explanation Acceptable examples n must be greater than 60 She must do it more times than in (a) n must be bigger, eg 100 Not acceptable examples If you increase the number of results, you increase the accuracy n must be bigger n is an integer n is 100	

Paper: 1MA1/3H				
Question	Working	Answer	Mark	Notes
11 (a)		57	B1	cao
(b)		Decision and reason	C1	Jamil might not be correct and reason, eg the maximum weight could be less than 80 or the minimum weight could be less than 40
(c)		Shown	C1	for evidence of reading from the graph at weight 65 (= 48 to 49) or at cf 45 (= 63)
			C1	eg 25% of 60 is 15 but only 11 potatoes have a weight greater than 65g or 25% of potatoes have a weight greater than 63g
12		48	M1	for $0.25 \times 0.6 (= 0.15)$ or $0.75 \times 0.4 (= 0.3)$
			M1	for $0.25 \times 0.6 (= 0.15)$ and $0.75 \times 0.4 (= 0.3)$ or for $24 \div "0.15" (= 160)$
			A1	cao
13		$(x + 3)^2 - 16$	M1	for $(x + 3)^2$ or $(x^2 + 6x - 7) x^2 + 2ax + a^2 + b$
			A1	cao
14		Shown	M1	for $\sqrt[3]{\frac{8}{27}} (= \frac{2}{3})$ or $\sqrt[3]{\frac{27}{8}} (= \frac{3}{2})$ or $2 : 3$ or $3 : 2$
			M1	for $\left(\sqrt[3]{\frac{8}{27}}\right)^2 (= \frac{4}{9})$ or $\left(\sqrt[3]{\frac{27}{8}}\right)^2 (= \frac{9}{4})$ or $4 : 9$ or $9 : 4$
			A1	132 from correct arithmetic



Paper: 1MA1/2H				
Question	Answer	Mark	Mark scheme	Additional guidance
17 (a)	4, 6, 5, 4	M1	for a correct method to find at least 2 frequencies from bars of different widths, eg $10 \times 0.4 (=4)$, $10 \times 0.6 (=6)$, $5 \times 1 (=5)$, $20 \times 0.2 (=4)$	
		A1	cao	
(b)	10	M1	for $\frac{23+1}{4} (=6)$ or $\frac{23}{4} (=5.75)$ could fit from their table in (a)	
		A1	for 10 or 9.375	Be aware of 10 coming from incorrect working ft does not apply to the A1
18	39.5	P1	for a start to a process eg, for a correct trigonometric statement, eg $\sin 48 = \frac{7.3}{AC}$ or $\cos 42 = \frac{7.3}{AC}$ or $\frac{AC}{\sin 90} = \frac{7.3}{\sin 48}$ OR angle CAH unambiguously identified on a diagram	Must include correct values
		P1	for a complete correct process to find AC, eg $(AC =) \frac{7.3}{\sin(48)} (=9.8..)$ or $(AC =) \frac{7.3}{\cos(42)} (=9.8..)$ or $(AC =) \sin 90 \times \frac{7.3}{\sin 48} (=9.8..)$	
		P1	for a correct statement using angle CAH, eg $\tan(CAH) = \frac{8.1}{9.8..}$ OR $\sqrt{8.1^2 + 9.8^2} (=12.7...)$ and $\frac{\sin CAH}{8.1} = \frac{\sin 90}{12.7}$	
		A1	for answer in the range 39.5 – 39.51	If an answer is given in the range but then incorrectly rounded award full marks.



Paper: 1MA1/1H				
Question	Answer	Mark	Mark scheme	Additional guidance
11 (a)	59, 53, 66	B2 (B1)	for Median = 59, LQ = 53, UQ = 66, may be seen in working for one correct)	
(b)	Yes, with reason	C1	for Yes and comment comparing median ages, ft from (a) Acceptable examples "59" < 70 All statistics/values are lower for coach A (so they are younger) Median is lower The middle age is lower on coach A Not acceptable examples Median is higher Median for coach A is "59" and coach B is 70 The oldest on coach A is 79 and the oldest on coach B is 85 There are people on coach B that are older than on coach A	
(c)	No, with reason	C1	for No and comment comparing spreads of ages from ranges or IQRs, ft from (a) Acceptable examples 38 < 43 or "13" < 19 Greater difference between greatest and least age for coach B Range for coach B is larger than coach A The range of ages is wider on coach B than on coach A The range is 5 greater on coach B There is a smaller difference between the lower and upper quantiles on coach A than on coach B The IQR is shorter for coach A Not acceptable examples Quartiles are less for coach A 53 < 54 or 79 < 85 (oe) Range for coach A is 38 and range for coach B is 43 Coach A ranges from 41-79 but coach B ranges from 42-85	Working A: Range = 38, IQR = "13" B: Range = 43, IQR = 19

Paper: 1MA1/3H				
Question	Answer	Mark	Mark scheme	Additional guidance
21	210	M1	for method to find total frequency, $60 \times 2 (= 120) + 30 \times 5 (= 150) + 30 \times 9 (= 270) + 15 \times 6 (= 90)$ $+ 45 \times 2 (= 90)$ or 720 OR for method to find the total area, $4 + 5 + 9 + 3 + 3 (= 24 \text{ cm}^2)$	Accept one error in total for the award of the method marks 24 must be from adding areas of bars not heights of bars
		M1	for finding the number of onions less than 60g or greater than 120 g = $120 + 90 + 90 (= 300)$, OR for finding the number of onions between 60g and 120g = $150 + 270 (= 420)$ OR for finding the area under the graph less than 60 or greater than 120 = $4 + 3 + 3 (= 10 \text{ cm}^2)$ OR for finding the area under the graph between 60 and 120 = $5 + 9 (= 14 \text{ cm}^2)$	14 must be from adding areas of bars not heights of bars
		M1	(dep M2) for $1 - \frac{300}{720} (= \frac{7}{12})$ oe OR for $\frac{420}{720} (= \frac{7}{12})$ oe OR for $\frac{14}{24} (= \frac{7}{12})$ oe	Accept 58.3...%
		A1	cao	



Paper: IMA1/3H				
Question	Answer	Mark	Mark scheme	Additional guidance
16 (a)	129 to 160	M1	for a method to find an estimate for the area under the curve eg $0.5 \times 30 \times 9$	Do not accept 30×9 Award full marks for any correct method leading to a better estimate.
		A1	for value in the range 129 to 160 (If M0, SC B1 for 126 or 127.5)	
	(b) underestimate with reason	C1	(dep M1) for “underestimate” and appropriate reason linked to their method, eg area between triangle and curve not included	
	(c) Explanation	C1	for explanation, Acceptable examples method gives average acceleration (in first 60 seconds) he has not used/drawn a tangent (at time 60 seconds) he has not worked out the gradient (at time 60 seconds) Not acceptable examples he has not used strips he has calculated it accurately rather than using an estimate the estimate of 13 should be about 4.4 the answer should be approximately 0.073	
17	7.645	P1	for process to use area to find at least one frequency, eg for first frequency $(7.2 - 6.4) \times 10 (= 8)$ or $(7.2 - 6.4) \times 5 (= 4)$ or $4 \times 5 (= 100)$	Frequencies could be written on the graph Marks are for correct processes, one or more frequencies may be incorrect Award full marks if a correct answer is seen in working and is then incorrectly rounded.
		P1	for process to find all frequencies, eg 8, 20, 40, 12 or multiples eg 4, 10, 20, 6 or 100, 250, 500, 150	
		P1	(dep P2) for process to estimate mean, eg $((6.8 \times [8]) + (7.4 \times [20]) + (7.8 \times [40]) + (8.1 \times [12])) \div ([8] + [20] + [40] + [12])$	
		A1	for 7.645 (accept 7.65)	

Paper: 1MA1/2H																												
Question	Answer	Mark	Mark scheme	Additional guidance																								
9 (a)	138	M1	for upper quartile = 188 or lower quartile = 50 or an indication that they are trying UQ – LQ	Could be written on the grid																								
		A1	cao																									
	(b)	Yes, with reason	C1		Yes, with reason Acceptable examples Yes, because the median is at 2 hour (120 min) Yes, since 50% is at the 2 hour mark Yes, because the middle is at 2 hours Not acceptable examples No The median is at the 2 hour mark Yes, because 50% is exactly half way between “188” and “50”																							
(c)	statement	C1	Acceptable examples The median is lower on Tuesday (higher on Monday) The upper quartile is lower on Tuesday (higher on Monday) There may just have been one person waiting for 210 mins We don’t know how many people were waiting for each time Not acceptable examples The range is bigger for Tuesday (smaller for Monday) The IQR is smaller for Tuesday (bigger for Monday)	<table><tr><td></td><td>M</td><td>T</td></tr><tr><td>Shortest time</td><td>20</td><td>20</td></tr><tr><td>Lower quartile</td><td>50</td><td>50</td></tr><tr><td>Median</td><td>120</td><td>100</td></tr><tr><td>Upper quartile</td><td>188</td><td>140</td></tr><tr><td>Longest time</td><td>200</td><td>210</td></tr><tr><td>Range</td><td>180</td><td>190</td></tr><tr><td>IQR</td><td>138</td><td>90</td></tr></table>		M	T	Shortest time	20	20	Lower quartile	50	50	Median	120	100	Upper quartile	188	140	Longest time	200	210	Range	180	190	IQR	138	90
	M	T																										
Shortest time	20	20																										
Lower quartile	50	50																										
Median	120	100																										
Upper quartile	188	140																										
Longest time	200	210																										
Range	180	190																										
IQR	138	90																										

Paper: 1MA1/2H					
Question	Answer	Mark	Mark scheme	Additional guidance	
17	30	P1	for process to find one correct frequency, eg. $0.8 \times 5 (=4)$ or $1.6 \times 10 (=16)$ or $2.2 \times 10 (=22)$ or $1.2 \times 15 (=18)$ or to find one correct area eg $5 \times 8 (=40)$ or $10 \times 16 (=160)$ or $10 \times 22 (=220)$ or $15 \times 12 (=180)$	Accept equivalent methods proportional to those shown. Condone 1 error in reading from the graph for 2 nd and 3 rd P marks	
		P1	for process to find total number of people, eg. "4" + "16" + "22" + "18" (= 60) or for process to find total area eg "40" + "160" + "220" + "180" (= 600)		
		P1	for process to find 20% of the total number of people, eg. "60" $\times$ 0.2 oe (= 12) or for process to find 20% of the total area "600" $\times$ 0.2 oe (=120)		
		A1	cao	NB: correct answer without supportive working gets 0 marks	
18	(a) 37, 143, 397, 503	M1	for any two correct angles within the ranges below or for a correct method to find a solution beyond 360, eg. "angle read from 0 to 360" + 360	Accept given as coordinates for M1 only Quoted are just the more likely solutions but check all attempts Condone missing degrees sign	
		A1	for all 4 angles in the range, 35 to 40, 140 to 145, 395 to 400 and 500 to 505		
	(b) $y = -\sin x^\circ$	B1	for any acceptable equations, eg. $y = -\sin x^\circ$ or $y = \sin(-x^\circ)$ or $-y = \sin x^\circ$ or $y = \cos(x^\circ + 360n + 90)$ or for any positive integer n , $y = \sin(x^\circ - (2n - 1)180)$ or $y = \cos(x^\circ + 360n)$		
	(c) graph	C1	for correct graph shown translated 2 in the positive x-direction		

Paper: 1MA1/2H				
Question	Answer	Mark	Mark scheme	Additional guidance
15	$n^2 + 3n - 1$	M1 M1 A1	for a correct start to a method to find the n th term, eg constant 2nd differences and n^2 OR states $2a = 2$ or $3a + b = 6$ for working with n^2 , eg n^2 and sequence 2, 5, 8, ... OR states $2a = 2$ and $3a + b = 6$ for $n^2 + 3n - 1$	Need to see constant second difference found and n^2 Condone use of different variable throughout $a = 1$ or $b = 3$ implies M1 $n^2 + 3n$ implies M2 $a = 1$ and $b = 3$ implies M2
16 (a)	Bar of height 2.4 cm (fd = 1.2) drawn for interval 40 – 60 hours	M1 A1	for using area to represent frequency, eg 11.2 (cm ²) represents 28 (students) or for showing correct scale on fd axis, 2 cm = 1 unit or correct process to find the height of bar, eg $\frac{28}{10}$ (= 2.8) or $\frac{24}{20}$ (= 1.2)	May use any unit of area. Can be implied by frequency of 32 or 36.
(b)	120	M1 A1	ft their histogram for method to find total frequency, eg (1.6 × 20) + (3.6 × 10) + 28 + 24 oe or for method to find total area under the histogram, eg (4 × 3.2) + (2 × 7.2) + (2 × 5.6) + (4 × 2.4) (= 48) oe for 120 ft	Can ignore scale if bar is correct Condone 1 error in reading fd values or measurements.

Paper: 1MA1/2H				
Question	Answer	Mark	Mark scheme	Additional guidance
15 (a)	$5n^2 + 2n - 4$	M1	for a correct start to a method to find the n th term, eg constant 2nd differences and n^2 OR states $2a = 10$ or $3a + b = 17$	Need to see constant 2nd difference found and n^2 Condone use of a different variable throughout $a = 5$ or $b = 2$ implies M1 $5n^2 + 2n$ implies M2 $5n^2$ is implied by 5, 20, 45, ... $a = 5$ and $b = 2$ implies M2 Condone $+ - 4$
		M1	for working with $5n^2$, eg $5n^2$, and sequence $-2, 0, 2, \dots$ OR states $2a = 10$ and $3a + b = 17$	
		A1	for $5n^2 + 2n - 4$ oe	
	1.2	M1	for substituting values, eg $4 = k \times 9 + k$ or $4 = k(9 + 1)$ or $(k = 0.4)$	
		M1	for $(u_3 =) "0.4" \times 4 + "0.4" (= 2)$	
		A1	for 1.2 oe	
16	Histogram completed	M1	for method to use area to find at least one other frequency (not 11), eg $10 \times 1.5 (= 15)$ or $20 \times 0.3 (= 6)$	Condone one error in reading FD Ft one error from reading FD
		M1	for method to find unknown frequencies, eg $(60 - 11 - "15" - "6") \div 2 (= 14)$	
		M1	ft for method to find an unknown frequency density, eg $"14" \div 5 (= 2.8)$ or $"14" \div 10 (= 1.4)$ or one correct bar drawn	
		C1	cao	

Paper: 1MA1/1H				
Question	Answer	Mark	Mark scheme	Additional guidance
15	$\frac{130}{400}$ oe	M1	for a method to find the frequency (or area) of one relevant interval, eg $3 \times 10 (= 30)$ or $5 \times 20 (= 100)$ or $8 \times 15 (= 120)$ or $10 \times 15 (= 150)$ or $5 \times 10 (= 50)$ or $8 \times 10 (= 80)$ or, using $1 \text{ cm}^2 = 1 \text{ unit}$, $3 \times 2 (= 6)$ or $5 \times 4 (= 20)$ or $8 \times 3 (= 24)$ or $10 \times 3 (= 30)$ or $5 \times 2 (= 10)$ or $8 \times 2 (= 16)$	Evidence for this mark may be seen on the diagram Accept equivalent methods For M marks condone use of 2.5 for fd of 3 and/or 4.5 for fd of 5
		M1	for a method to find the total frequency (or area), eg “30” + “100” + “120” + “150” (= 400) or “6” + “20” + “24” + “30” (= 80)	
		M1	for a method to find the frequency (or area) between 20 g and 40 g, eg “50” + “80” (= 130) or “10” + “16” (= 26)	
		A1	for $\frac{130}{400}$ oe	Accept any equivalent fraction, decimal form, 0.32(5) or 0.33 or percentage form, 32.5)% or 33%



Paper 1MA1: 3H				
Question	Working	Answer	Mark	Notes
6		1.01	P1 P1 P1 A1	fruit syrup $15 \times 1.4 (= 21)$ or water $280 \times 0.99 (= 277.2)$ or apple juice $25 \times 1.05 (= 26.25)$ (dep P1) for complete process to find the total mass e.g. “277.2” + “26.25” + “21” (= 324.45) or a weighted density eg $15 \times 1.4 \div 320 (= 0.065625)$ or $280 \times 0.99 \div 320 (= 0.86625)$ or $25 \times 1.05 \div 320 (= 0.08203125)$ (dep P2) for complete process to find the density eg “324.45” $\div 320 (= 1.01\dots)$ or “0.065625” + “0.86625” + “0.08203125” (= 1.0139..) 1.01 to 1.014
7		5.86	M1 A1	for $\sin 23 = \frac{AB}{15}$ NB Allow any alternative equivalent method to form an equation in AB 5.8 to 5.9
8		5.59	M1 M1 M1 A1	For use of $\pi r^2 = 49$, where r is the radius or $r = 3.9(49\dots)$ or diameter = 7.8(9865...) For use of Pythagoras to set up an equation in x^2 e.g. $x^2 + x^2 = (d)^2$ or $x^2 = r^2 + r^2$ For use of trigonometry to set up an equation in x eg $\sin 45 = x \div d$ (dep on M2) Rearrange to $(x^2 =) 2 \times “3.949\dots”^2$ Rearrange to $(x =) “7.898\dots” \times \sin 45$ oe 5.5 to 5.6
9	(a) (b) 60,180,300,350,650 (c) Medians 250 and 300	180 Statement	M1 A1 B2 (B1) C1	for evidence of using the LQ (150) and UQ (330) eg $330 - 150$ cao for fully correct box plot for showing a box and at least 3 correctly plotted values for a correct comparative statement relevant to the question e.g. Yes because the female students have a greater median than the male students

Paper: 1MA1/2H				
Question	Working	Answer	Mark	Notes
17 (a)	1.5, 6, 10.2, 7.2, 1.2	Histogram drawn	C1	for 2 correct bars of different widths or at least 3 correct frequency densities.
			C1	for all bars in correct proportions or 4 correct bars with axes scaled and labelled.
			C1	for fully correct histogram with axes scaled and labelled.
(b)		$\frac{123}{150}$	M1	for a method to find number of students in interval, eg $30 + 51 + 36 + \frac{1}{3} \times 18 (= 123)$ or $150 - 15 - \frac{2}{3} \times 18 (= 123)$
			A1	for $\frac{123}{150}$ oe or 0.82 or 82%
18		0.98	B1	cao



Paper: 1MA1/1H				
Question	Answer	Mark	Mark scheme	Additional guidance
10 (a)	Box plot drawn	B3	for a fully correct box plot	Condone the lack of a vertical marker at the end of the tails
		(B2)	for at least 3 correctly plotted values including box and whiskers/tails)	Note that a box must be present, as must "tails"
		(B1)	for at least 2 correctly plotted values including box or whiskers/tails or 5 correct values plotted or clearly identified and no box or whiskers/tails)	
(b)	60	M1	for a method to find $\frac{3}{4}$ of 80 eg $20 + 20 + 20$ or $\frac{3}{4} \times 80$	
		A1	cao	
11	$90 - 2x$	M1	for identifying an unknown angle eg $BAO = x$, $AOB = 180 - 2x$, $OBC = 90$, $ABC = 90 + x$	Could be shown on the diagram alone
		M1	full method to find the required angle eg a method leading to $180 - x - x - 90$	Needs to be an algebraic method Accept $x + x + 90 + y = 180$ for M2
		A1	for $90 - 2x$	
		C2	(dep M2) full reasons for their method, from base angles in an <u>isosceles triangle</u> are equal <u>angles</u> in a <u>triangle</u> add up to 180° a <u>tangent</u> to a circle is perpendicular to the <u>radius (diameter)</u> <u>angles</u> on a straight <u>line</u> equal 180° the <u>exterior angle</u> of a triangle is <u>equal</u> to the sum of the <u>interior opposite angles</u>	Underlined words need to be shown; reasons need to be linked to their method; any reasons not linked do not credit.
		(C1)	(dep M1) for a <u>tangent</u> to a circle is perpendicular to the <u>radius (diameter)</u>	Apply the above criteria

Paper: 1MA1/3H				
Question	Answer	Mark	Mark scheme	Additional guidance
17 (a)	Histogram drawn	B3	for fully correct histogram eg relative heights 6, 3, 4, 2, 2	
		(B2	for 4 correct blocks or all 5 frequency ÷ class interval and 1 correct block)	
		(B1	for at least 2 correct blocks of different widths or for frequency ÷ class interval for at least 3 frequencies)	
(b)	66 to 71	M1	indication of the median in the third interval or proportional method shown	Just stating the interval is sufficient for this mark May be implied by the number on the answer line Median is at (approx.) 68.75 by a proportional method
		A1	ft answer between 66 and 71	
18	2.7 with statement	B1	for 179.5 or 180.5 or 180.4999...	
		B1	for 486.5 or 487.5 or 487.4999...	
		P1	for a correct process to find a bound for average speed, eg [upper bound of distance] ÷ [lower bound of time] where $487 < [\text{UB of distance}] \leq 487.5$ and $179.5 \leq [\text{LB of time}] < 180$ or for [lower bound of distance] ÷ [upper bound of time] where $486.5 \leq [\text{LB of distance}] < 487$ and $180 < [\text{UB of time}] \leq 180.5$	
		A1	(dep on all previous marks) for 2.695(2...) and 2.715(8 ...) with both values clearly coming from working with correct values	
		C1	for 2.7 from 2.695... and 2.715... and statement that both LB and UB round to 2.7	

Paper: 1MA1/2H				
Question	Answer	Mark	Mark scheme	Additional guidance
10 (a)	Explanation	C1	for explanation, eg Acceptable examples The IQR is half the data This is half the data $\frac{3}{4}$ of the data is less than 350(000) $\frac{3}{4}$ of the data is more than 160(000) $\frac{1}{4}$ of the data is lies between 60(000) and 350(000) $\frac{1}{4}$ of the data lies between 160(000) and 350(000) Not acceptable examples The data lies between 160 and 350 The IQR is 190 (000) IQR = UQ – LQ The upper and lower quartiles represent half the data	Zeros can be present or missing, but must be consistent.
(b)	box plot drawn	B2	for fully correct box plot	Box can be of any height. Accept ends that are marked (eg line, cross, dot) or defined by the end of the whiskers if clear
		(B1)	for showing a box and at least 3 correctly plotted values)	
(c)	decision and comparisons	C1	(ft) for correct comparison of medians eg the median for online is greater than the median for the shop, the shop takes less money from sales in general as the median is lower	Simply quoting values for median, range and IQR is insufficient, they must be compared
		C1	(ft) for a correct comparison of a measure of spread, eg the interquartile (range) of sales for the online store is greater than the IQR for the sales of the shop	Median Range IQR Online 200 360 190 Shop 170 320 180
			Comparisons for this mark can relate to the range or the IQR. For the award of both marks at least one comparison must be in the context of the question.	Also accept figures as 000s as long as consistent. Figures need not be seen but if given they must be correct.

Paper: 1MA1/3H				
Question	Answer	Mark	Mark scheme	Additional guidance
17 (a)	histogram drawn	B3	for fully correct histogram, eg. relative heights 90, 96, 44, 8, 6	
		(B2 or (B1	for 4 correct bars or for frequency ÷ class interval for all 5 frequencies and 2 correct bars of different widths) for 2 correct bars of different widths or for frequency ÷ class interval for at least 3 frequencies)	
(b)	$0.4n$	M1	for finding ratio of heights or widths of bars, eg $5 : 1$ or $\frac{1}{5} : 1 : 2$ or $\frac{n}{5}$ oe or $2n$ oe as answer or compares areas of bars, eg 6 and 2.4 or 3 and 1.2 or 150 and 60	
		A1	for $0.4n$ oe	
18	30.6	P1	for process to find TC , eg. $(TC =) 14 \times \frac{3}{3+4} (= 6)$	Lengths of TC , TD , SD may be seen on the diagram
		P1	for process to find TD , eg. $(TD =) \sqrt{14^2 + "6"'^2}$ or $\sqrt{232}$ or $2\sqrt{58}$ ($= 15.2\dots$)	
		P1	for process to find SD , using area of a trapezium, $147 = 0.5 \times (SD + 12) \times 14$, or $SD = 9$	A complete set of processes to find the angle is needed where an alternative route is involved with more than one stage in the working If an answer is given in the range in working and then rounded incorrectly award full marks.
		P1	for $\tan^{-1}\left(\frac{"9"}{"15.2\dots"}\right)$	
		A1	for answer in the range 30.4 to 30.7	

Paper: 1MA1/3H				
Question	Answer	Mark	Mark scheme	Additional guidance
9	56	P1 A1	for $70 \times 80 \div 100$ oe or for the use of $0.7 \times 0.8 (= 0.56)$ oe cao	
10	3.1	P1 P1 A1	for using sin to find length of AC, eg $6.8 \times \sin 41$ or a full process to find AC or $(AC =) 4.46...$ or a full process to find AD or $(AD =) 5.44...$ for a complete process to find a relationship involving DC eg $\tan 55 = \frac{4.46...}{DC}$ or $(DC =) \frac{4.46...}{\tan 55}$ or $\cos 55 = \frac{DC}{5.44...}$	Accept rounded or truncated figures. If a correct answer within the range is shown in working but is incorrectly rounded, award full marks.
11 (a)	Box plot	B3 (B2 (B1	for fully correct box plot for box plot showing a box and whiskers and at least 3 correctly plotted values from 169, 174, 177, 180, 186) for at least 2 correctly plotted values including a box or whiskers)	Box can be of any height. Accept ends that are marked (eg line, cross, dot) or defined by the end of the whiskers if clear
(b)	Comparisons	C1 C1	(ft) for a correct comparison of medians, eg the median for Adults is greater than the median for Teenagers or the Teenagers heights are lower in general as the median is lower (ft) for a correct comparison of a measure of spread, eg the interquartile (range) of the Adults is the same as (similar to) the IQR of the Teenagers, the range of the Teenagers is greater than the range of the Adults Comparisons for this mark can relate to the range or the IQR.	For 2 marks, at least one comparison must be in context (eg refers to heights or cm). Simply quoting values for median and range and IQR is insufficient, they must be compared Median Range IQR Adults 177 17 6 Teenagers 169 20.5 6 Figures need not be seen but if given they must be correct.

Paper: 1MA1/1H				
Question	Answer	Mark	Mark scheme	Additional guidance
11 (a)(i)	Box plot	B2	for fully correct box plot	Accept ends that are marked (eg line, cross, dot) or defined by the end of the whiskers if clear
		(B1	for median plotted at 900 or whiskers plotted finishing at 300 and 1300)	
(ii)	780 and 1200	B1	for 780 and 1200 correctly placed in the table	
(b)	60	M1	for a complete method eg $\frac{3}{4} \times 80$ oe	
		A1	cao	
12	$y = -\frac{2}{3}x - 1$	M1	for a method to find gradient of perpendicular line, eg $y = \frac{3}{2}x(-\frac{7}{2})$ and $\frac{3}{2} \times m = -1$ or gradient of perpendicular shown as $-\frac{2}{3}$	
		M1	for a method to find the value of c , eg $-5 = "-\frac{2}{3}" \times 6 + c$ or $y - -5 = "-\frac{2}{3}"(x - 6)$ oe	
		A1	for $y = -\frac{2}{3}x - 1$ oe eg $2x + 3y + 3 = 0$ or $y + 5 = -\frac{2}{3}(x - 6)$	
			SC B1 for $y = -\frac{1}{3}x - 3$ oe if M0 scored	



Paper: 1MA1/1H				
Question	Answer	Mark	Mark scheme	Additional guidance
13 (a)	Histogram drawn	B3	for fully correct histogram with axes scaled and labelled	Relative heights 2, 3.5, 4.4, 2, 0.8
		(B2)	for 4 correct bars or for frequency ÷ class width for all 5 frequencies and 2 correct bars of different widths)	
		(B1)	for 2 correct bars of different widths or for frequency ÷ class width for at least 3 frequencies)	
		M1	for a method to find number of people in interval eg $\frac{1}{2} \times 70 + 22 + \frac{1}{3} \times 30 (= 67)$ or $150 - 20 - 8 - \frac{1}{2} \times 70 - \frac{2}{3} \times 30 (= 67)$ or $10 \times [3.5] + 5 \times [4.4] + 5 \times [2]$ ft their histogram	
(b)	$\frac{67}{150}$	A1	for $\frac{67}{150}$ or ft their histogram	Where [3.5], [4.4] and [2] are the heights of the bars of their histogram
14	$6x^3 - 23x^2 - 38x + 15$	M1	for method to find the product of any two linear expressions (3 out of 4 terms correct or 4 correct terms ignoring signs) eg $6x^2 + 9x - 2x - 3$ or $3x^2 - 15x - x + 5$ or $2x^2 - 10x + 3x - 15$	Note that, for example, $7x - 3$ in expansion of $(3x - 1)(2x + 3)$ is regarded as 3 correct terms Do not award this mark for eg $6x^2 + 9x - 2x - 3 + 3x^2 - 15x - x + 5$ First product must be quadratic with at least 3 terms but need not be simplified or may be simplified incorrectly
		M1	for a complete method to obtain all terms, half of which are correct (ft their first product) eg $6x^3 + 7x^2 - 30x^2 - 35x - 3x + 15$ or $6x^3 + 9x^2 - 32x^2 - 48x + 10x + 15$ or $6x^3 - 2x^2 - 21x^2 - 45x + 7x + 15$	
		A1	cao	

Paper: 1MA1/3H																	
Question	Answer	Mark	Mark scheme	Additional guidance													
11 (a)	Box plot drawn	M1	for method to find UQ (47) or greatest value (62) from the table	May be implied by one of these values being correctly plotted. Box can be any height. Accept ends that are marked (eg line, cross, dot) or defined by the end of the whiskers if clear													
		M1	for showing a box and at least 3 correctly plotted values from 25, 35, 40, 47, 62														
		A1	for a fully correct box plot														
	(b)	Comparison	C1	fit a correct comparison of medians from figures, eg the median speed for Sunday was greater than the median speed for Friday or the speed on Friday is generally lower as the median is lower	Simply quoting values is insufficient, they must be compared. <table><tr><td></td><td>Median</td><td>Range</td><td>IQR</td></tr><tr><td>Friday</td><td>40</td><td>37</td><td>12</td></tr><tr><td>Sunday</td><td>42</td><td>44</td><td>15</td></tr></table> Figures need not be stated but if they are they must be correct. For 2 marks, at least one comparison must be in context (eg refers to speed or mph)		Median	Range	IQR	Friday	40	37	12	Sunday	42	44	15
				Median		Range	IQR										
			Friday	40		37	12										
Sunday	42	44	15														
C1	fit for a correct comparison of spread, eg the (interquartile) range of the speeds for Friday is smaller than the (interquartile) range of the speeds for Sunday, the (interquartile) range on Sunday is larger than the (interquartile) range on Friday Comparisons for this mark can relate to the range or the IQR																
12	Correct enlargement	B2	for correct enlargement $(-2, -4)$, $(-2, -6)$, $(-6, -4)$	Award for clear intention, shading not needed.													
		(B1	for correct size and orientation but incorrect position or 2 out of 3 vertices correctly placed)														



Paper: 1MA1/2H				
Question	Answer	Mark	Mark scheme	Additional guidance
12 (a)	Drawn	B3	for a fully correct box plot	See diagram at end of scheme Min = 21 LQ = 31 Med = 35 UQ = 42 Max = 80
		(B2)	for 3 or 4 correctly plotted values including box and whiskers/tails)	
		(B1)	for 2 correctly plotted values including box or whiskers/tails or 5 correct values plotted or clearly identified and no box or whiskers/tails)	
(b)	16	B1	cao	Figures need not be stated, but if they are, they must be correct
(c)	Explanation	C1	Acceptable examples Not true as the median could be the average of two ages No, the median is not always one of the numbers in the data Because there is an even amount of numbers, there must be 2 in the middle that have a mean of 35 She could be correct if the middle two numbers are both 35 Not acceptable examples Yes... No more are between 31-35 than 35-42 No as there is an even number at least two must be 35 No the median is just the average We can't tell from the graph Because there is an even amount of numbers Not true as we do not know the exact ages of all data.	

Paper: 1MA1/1H					
Question		Answer	Mark	Mark scheme	Additional guidance
9	(a)	box plot drawn	B1	ends of whiskers at 0 and 42 with a box	The box can be of any height. Accept ends that are marked (eg line, cross, dot) or defined by the end of the whiskers if clear.
			B1	median at 10 inside a box	Has to be inside a box; whiskers not required
			B1	for ends of box at 4 and 20	An independent mark that can be awarded for just a box; do not need whiskers for this mark.
	(b)	Comparison	C1	for a correct comparison of medians, eg. the median delay time on Mon was greater than the median delay time on Tues. or ft (a)	Simply quoting values for median, range and IQR is insufficient, they must be compared
			C1	for a correct comparison of a measure of spread, eg. the interquartile range (range) of delay times on Mon was greater than the interquartile range (range) of delay times on Tues. or ft (a) For the award of both marks at least one of the comparisons must be in context	Comparisons can relate to the median, and then either the range or the IQR.
	(c)	statement	C1	‘No’ with statement explaining that there might not be any delays between 25 minutes and 30 minutes as in the upper 25% (12 trains) the delays may all be between 17 and 25 or 30 and 33	The ‘No’ may be implied from their wording, and could be written next to the “?” The statement must mention (or imply) values above the UQ of 17
10	(a)	$\frac{1}{5(x-1)}$	B1	for $\frac{1}{5(x-1)}$ or $\frac{1}{5x-5}$	
	(b)	$2(5+y)(5-y)$	M1	for partial factorisation, eg $2(25 - y^2)$ oe or $(10 + 2y)(5 - y)$ oe or $(5+y)(10 - 2y)$ oe	
			A1	or $-2(y^2 - 25)$ oe for $2(5+y)(5-y)$ or $-2(5+y)(y-5)$	



Paper: 1MA1/2H				
Question	Answer	Mark	Mark scheme	Additional guidance
11 (a)	5, 35, 55, 70, 78, 80	B1	cao	
(b)	cf graph	M1	for 5 or 6 of their points plotted correctly from a cf table	Ignore to the left of the first point and right of the last point
		A1	for a fully correct graph	Accept a smooth curve or line segments
			SCB1 if 5 or 6 of their points plotted not at end but consistent within each interval and joined by a curve or line segments providing no gradient is negative	
(c)	7.5	M1	for a clear method to read off the cf graph at 90	Sight of 74 or 6 implies M1
		M1	for a full method to find the percentage eg $(80 - "74") \div 80 \times 100 (=7.5)$	The following readings give the following percentages
		A1	for 7.5 or ft cf graph	72 = 10% 73 = 8.75% 74 = 7.5% 75 = 6.25% 76 = 5%

Paper: 1MA1/1H				
Question	Answer	Mark	Mark scheme	Additional guidance
9 (a)	21.6	M1	for a method using distance = speed $\times$ time, eg. $72 \times \frac{18}{60}$ or 7.2 km in 6 minutes, so 7.2×3 oe partitioning method	Accept 72×18
		A1	for 21.6 oe	
	No (supported)	M1	for a method to convert 20 m/s to km/h or 72 km/h to m/s, eg. $20 \times \frac{3600}{1000}$ (= 72) or $72 \times \frac{1000}{3600}$ (= 20)	Accept methods to convert both speeds to km/s or m/h
		C1	for No since 72 km/h = 20 m/s oe	
10 (a)	cf graph through (40, 5), (60, 25), (80, 35), (100, 38) and (120, 40)	C2	for a complete and accurate cf graph	May be a cumulative frequency curve or a cumulative frequency polygon Ignore any graph drawn to the left of the first point If histograms drawn, plots must be identified
		(C1	for at least 4 or 5 cf values plotted correctly) SC: B1 for 4 or 5 points plotted not at end but consistently within each interval and joined provided no gradient is negative	
	answer in range 21 to 28	M1	for UQ in the range 66 to 70 or LQ in the range 42 to 46 or ft their cf graph	Their graph must be a cf graph
		A1	for answer in range 21 to 28 or ft their cf graph	
	answer in the range $\frac{19}{40}$ to $\frac{24}{40}$	M1	for finding the difference between readings taken from the cf axis at points from a mark of 50 and a mark of 90 or ft their graph (if possible)	Accept any equivalent fraction, decimal from 0.475 to 0.6 or percentage from 47.5% – 60%
		A1	for an answer in the range $\frac{19}{40}$ to $\frac{24}{40}$ or ft their cf graph	

Paper: 1MA1/1H				
Question	Answer	Mark	Mark scheme	Additional guidance
12 (a)	5,15,35,55,70,80	B1	cao	
(b)	Graph drawn	M1	for 5 or 6 of their points plotted correctly from a cf table	Ignore to the left of the first point and right of the last point
		A1	for a fully correct graph SC B1 if 5 or 6 of their points plotted not at end but consistent within each interval and joined by a curve or line segments providing no gradient is negative	If histograms drawn, points must be identified Accept a smooth curve or line segments
(c)	Correct decision and correct figures	M1	for $60 \div 100 \times 80$ (=48) oe	ft from a cum freq graph
			reading value from graph at wage = 360 (=40) or for $35 + \frac{1}{5} \times 20$ (=39)	
		M1	reading value from graph at cf = 48 (=380)	for "40" $\div 80 \times 100$ (=50(%)) or for $60 \div 100 \times 80$ (=48)
		C1	ft for correct decision and correct figures, eg No with 48 and "380" or with "40" and "50" (%) or with "40" and 48	
13	196	P1	for vol A = $1400 \div 70$ (=20) or for mass B = 280×30 (=8400)	
		P1	for density C = $\frac{1400 + "8400"}{"20" + 30}$ (= $\frac{9800}{50}$) or answer with digits 196	
		A1	cao	An answer of 350 from $70 + 280$ gets no marks
14	0.42	P1	for appropriate multiplication eg 0.3×0.7 (=0.21) or 0.3×0.1 (=0.03) or 0.3×0.6 (=0.18)	Probabilities could also be given in fraction or percentage form
		P1	(dep) for complete process eg $0.3 \times 0.7 + 0.7 \times 0.3$ or $0.3 \times 0.1 + 0.3 \times 0.6 + 0.6 \times 0.3 + 0.1 \times 0.3$	
		A1	oe	Acceptable equivalents are 42% or $\frac{42}{100}$ oe

Paper: 1MA1/1H				
Question	Answer	Mark	Mark scheme	Additional guidance
10	(a) 10, 25, 50, 80, 85, 100 (b) Graph drawn	B1	cao	If histograms drawn, plots must be identified. Accept a smooth curve or line segments. Ignore to the left of the first point and right of the last point. If answer is in the range award the marks unless from obvious incorrect working
		M1	for 5 or 6 of their points plotted correctly from a cf table with no more than one error	
		A1	for a fully correct graph	
	(c) 35 to 39	B1	for answer in the range 35 to 39 or ft their graph (if possible)	
	(d) 85 to 93	M1	for finding the difference between readings taken from the profit axis at points from a cf of 25 and a cf of 75 ft their graph (if possible)	
		A1	for answer in the range 85 to 93 or ft their graph (if possible)	
11	8	P1	for a start to the process, eg $\frac{9}{9+4+x}$ or $(\frac{3}{7} \Rightarrow) \frac{9}{21}$ or states that the total number of sweets is 21	
		P1	for forming a correct equation without fractions, eg $9 \times 7 = 3(9 + 4 + x)$ or $21 = 9 + 4 + x$ OR for $21 - 9 - 4$ oe or $1 - \frac{9}{21} - \frac{4}{21} (= \frac{8}{21})$	
		A1	cao	



Paper: 1MA1/2H				
Question	Answer	Mark	Mark scheme	Additional guidance
15 (a)	3	B1	for 3 correctly placed in the first row	
(b)	Correct bars	B2	for both bars correct, heights of 4.5 and 1.4	
		(B1	for one bar correct out of a maximum of 2 bars)	
(c)	18.5	M1	for finding the area of at least 2 bars eg, $2 \times 2 (= 4)$ or $4 \times 2 (= 8)$ or $4 \times 4 (= 16)$ or $2 \times 6.5 (= 13)$ or $4 \times 0.5 (= 2)$	Condone 1 error in reading fd values or measurements.
		M1	for $(“43” + 1) \div 2 (= 22)$ and $10 \div 16 \times 4 (= 2.5)$ or $“43” \div 2 (= 21.5)$ and $9.5 \div 16 \times 4 (= 2.375)$	
		A1	For 18.5 or 18.375	
16	56.0	P1	for $\frac{BD}{\sin(112)} = \frac{7.9}{\sin(42)}$	
		P1	for complete process to find BD , eg $(BD =) \frac{7.9}{\sin(42)} \times \sin(112) (= 10.9\dots)$	Values may be rounded or truncated.
		P1	for area = $\frac{1}{2} \times [BD] \times 15.3 \times \sin(42)$	$[BD]$ must be clearly identified
		A1	for answer in the range 56.0 to 56.1 SCB2 for $BD = 10.9\dots$ if no marks are awarded.	If an answer is given in the range in working and then rounded incorrectly award full marks.

Paper: 1MA1/3H				
Question	Answer	Mark	Mark scheme	Additional guidance
13 (a)	$\frac{6}{80}$	M1	for correct method using the graph at 90 cm, eg $80 - 74 (= 6)$	Accept $80 - 75 (= 5)$
		A1	for $\frac{6}{80}$ oe, accept $\frac{5}{80}$ oe	Accept any equivalent fraction, decimal (0.075) or percentage (7.5%)
(b)	60	B1	for answer in the range 58.5 – 61.5	
(c)	35	M1	for $UQ = 75$ or $LQ = 40$	Allow UQ in range 74 to 76 Allow LQ in range 39 to 41 Value(s) may be seen on graph
		A1	for answers in the range 34 to 36 or ft acceptable readings from the graph	
(d)	Comparison made	C1	(ft) for a correct comparison of the IQRs eg the heights of the plants grown outside are more varied or the IQR of the plants grown outside is 35 cm but the IQR of the plants grown inside is only 30 cm.	The comparison must include some context (eg refers to heights or cm) Ignore any additional information provided there is no contradiction. Figures need not be seen but if given they must be correct.
14	$2n^2 + 3$	M1	for a correct start to a method to find the n th term eg constant 2nd differences of 4 and the term $2n^2$ or states $an^2 + bn + c$ (where bn may be missing) and $2a = 4$ or gives the sequence 2, 8, 18, ...	Need to see constant second difference found and $2n^2$ Condone use of different variable throughout
		A1	oe	



Paper: 1MA1/1H				
Question	Answer	Mark	Mark scheme	Additional guidance
8	4.5	P1 P1 A1	for process to find the area, eg $80 = \frac{720}{A}$ or (area =) $\frac{720}{80}$ (= 9) or $80 = \frac{720}{2x}$ or $2x = \frac{720}{80}$ for complete process to find the length, eg “9” $\div 2$ or $720 \div (2 \times 80)$ for 4.5 oe	
9 (a)	Box plot	B3 (B2) (B1)	for a fully correct box plot for a box drawn and at least three correctly plotted values from 8, 25, 34, 42, 74) for correctly identifying one of LQ (25), Median (34), UQ (42) from the cf graph)	Box can be any height. Accept ends that are marked (eg line, cross, dot) or defined by the ends of the whiskers if clear For LQ accept value in range 24 to 26 May be implied by one of these values being correctly plotted
(b)	Yes with supporting evidence	M1 M1 C1 M1 M1 C1	for $30 \div 100 \times 60$ (= 18) for reading from the graph at cf = 60 – “18” (= 40) for correct decision and correct figures Alternative for reading from the graph at mark = 40 (= 42) for $(60 - “42”) \div 60 \times 100$ (= 30) or for $60 - “42”$ (= 18) and $30 \div 100 \times 60$ (= 18) for correct decision and correct figures	

Paper: 1MA1/2H				
Question	Answer	Mark	Mark scheme	Additional guidance
11 (a)	7, 28, 43, 54, 60	B1	cao	
(b)	cf graph	M1	for 4 or 5 of their points plotted correctly from a cf table	Ignore any histograms
		A1	for a fully correct graph	Ignore anything drawn to the left of the first point
			SCB1 if 4 or 5 of their points plotted not at the end but consistent within each interval and joined; providing no gradient is negative	Accept a smooth curve or line segments
(c)	3.4 to 4	M1	for at least one correct quartile, eg (UQ =) value in the range 6.2 to 6.4 or (LQ =) value in the range 2.6 to 2.8 or ft their cf graph	CF graph must have no negative gradient to award ft
		A1	for answer in the range 3.4 to 4 or ft their cf graph	
(d)	7 to 10	M1	for cf reading at weight = 7.4 in the range 50 to 53 or ft their cf graph	CF graph must have no negative gradient to award ft
		A1	for answer in the range 7 to 10 or ft their cf graph	

