1. Mary recorded the heights, in centimetres, of the girls in her class.

She put the heights in order.

132	144	150	152	160	162	162	167
167	170	172	177	181	182	182	

(a) Find

(i) the lower quartile,

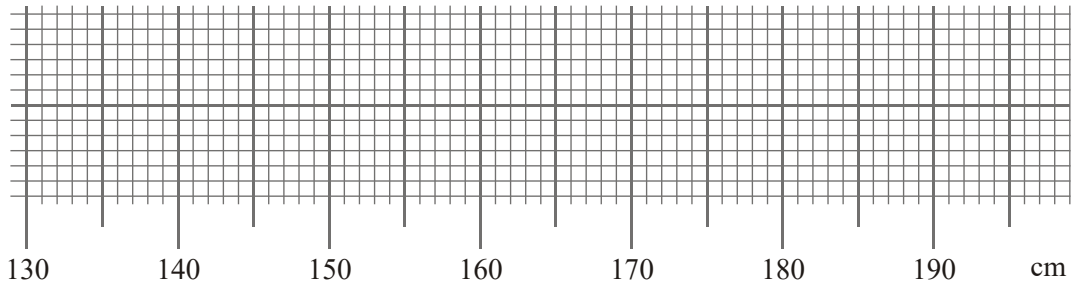
..... cm

(ii) the upper quartile.

..... cm

(2)

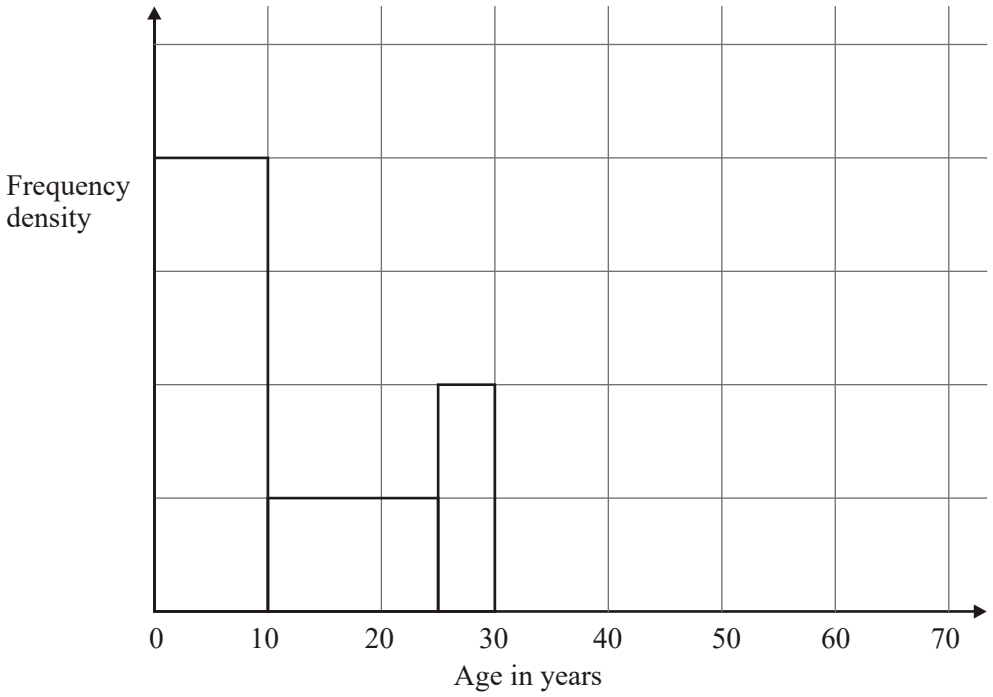
(b) On the grid, draw a box plot for this data.



(3)

(Total 5 marks)

2. The incomplete table and histogram give some information about the ages of the people who live in a village.



(a) Use the information in the histogram to complete the frequency table below.

Age (x) in years	Frequency
$0 < x \leq 10$	160
$10 < x \leq 25$	
$25 < x \leq 30$	
$30 < x \leq 40$	100
$40 < x \leq 70$	120

(2)

(b) Complete the histogram.

(2)
(Total 4 marks)

3. A garage keeps records of the costs of repairs to its customers' cars.
The table gives information about the costs of all repairs which were less than £250 in one week.

Cost, (£C)	Frequency
$0 < C \leq 50$	4
$50 < C \leq 100$	8
$100 < C \leq 150$	7
$150 < C \leq 200$	10
$200 < C \leq 250$	11

(a) Find the class interval in which the median lies.

.....

(2)

There was only one further repair that week, not included in the table.
That repair cost £1000.

Dave says 'The class interval in which the median lies will change.'

(b) Is Dave correct? Explain your answer.

.....

.....

(1)

The garage also sells cars.
It offers a discount of 20% off the normal price for cash.

Dave pays £5200 cash for a car.

(c) Calculate the normal price of the car.

£.....

(3)
(Total 6 marks)

4. The table shows information about the heights of 40 bushes.

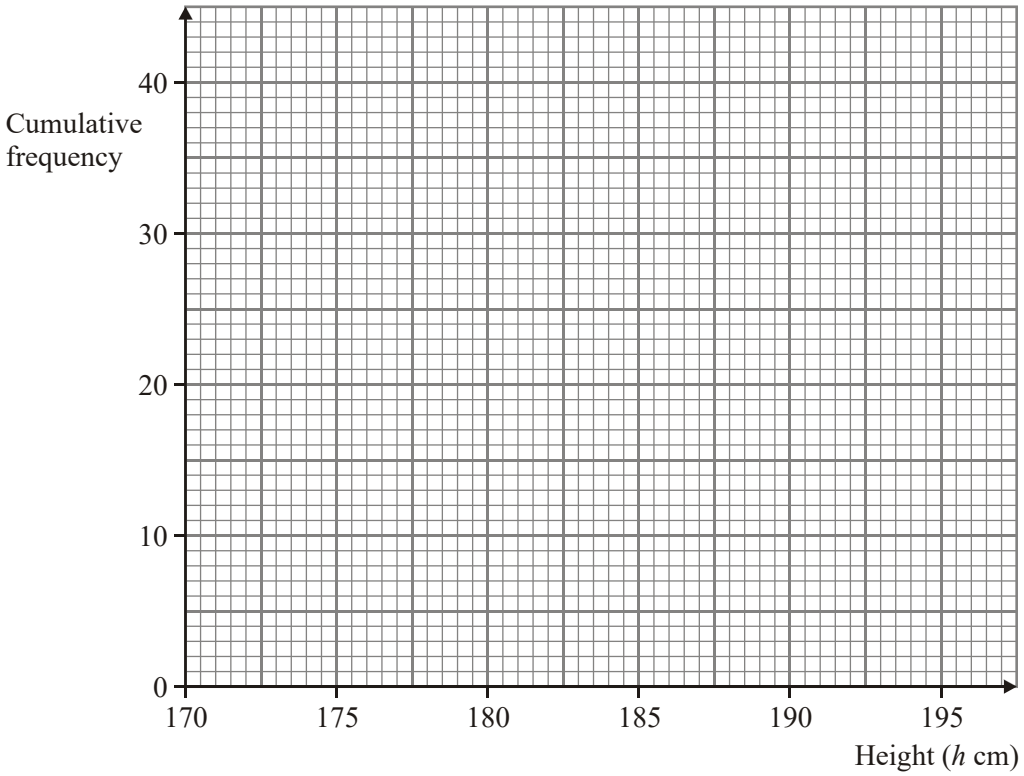
Height (h cm)	Frequency
$170 \leq h < 175$	5
$175 \leq h < 180$	18
$180 \leq h < 185$	12
$185 \leq h < 190$	4
$190 \leq h < 195$	1

(a) Complete the cumulative frequency table.

Height (h cm)	Cumulative Frequency
$170 \leq h < 175$	
$170 \leq h < 180$	
$170 \leq h < 185$	
$170 \leq h < 190$	
$170 \leq h < 195$	

(1)

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



(2)

(c) Use the graph to find an estimate for the median height of the bushes.

…… cm

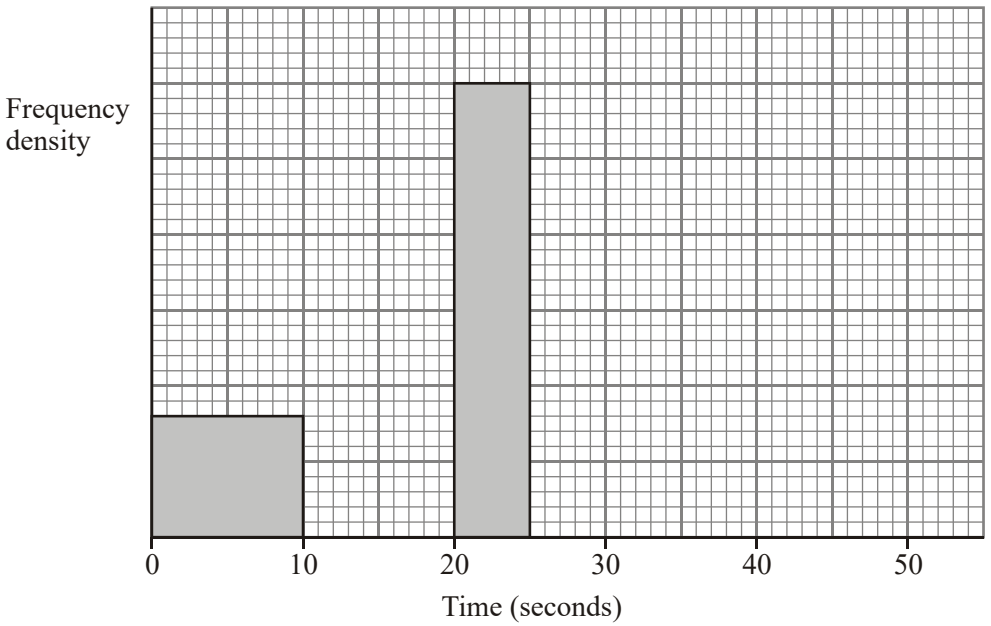
(1)
(Total 4 marks)

5. One Monday, Victoria measured the time, in seconds, that individual birds spent on her bird table.

She used this information to complete the frequency table.

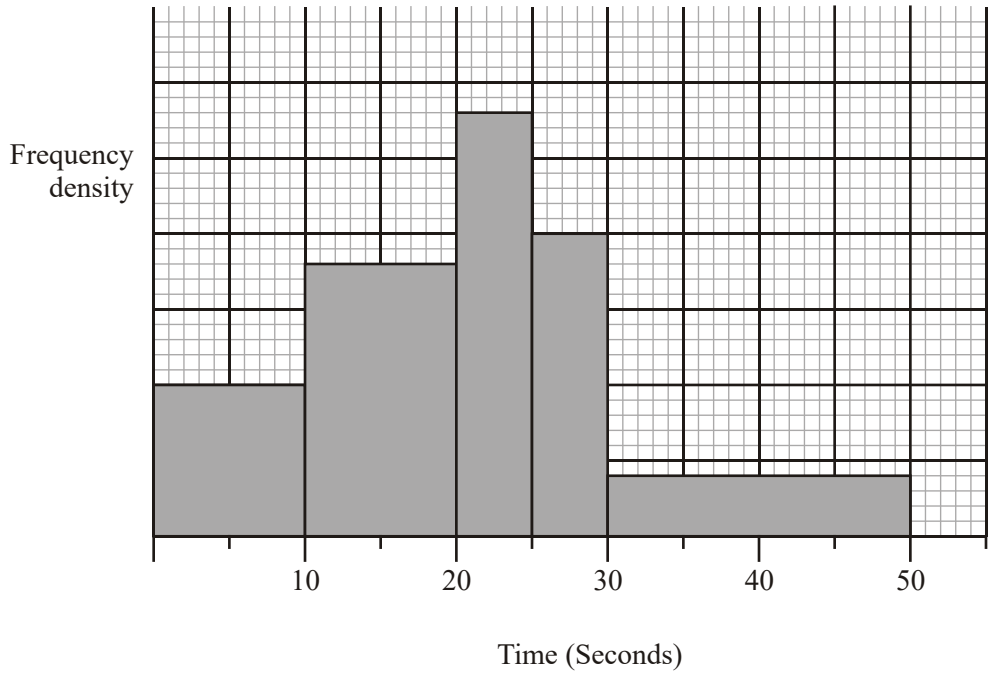
Time (t seconds)	Frequency
$0 < t \leq 10$	8
$10 < t \leq 20$	16
$20 < t \leq 25$	15
$25 < t \leq 30$	12
$30 < t \leq 50$	6

(a) Use the table to complete the histogram.



(3)

On Tuesday she conducted a similar survey and drew the following histogram from her results.



(b) Use the histogram for Tuesday to complete the table.

Time (t seconds)	Frequency
$0 < t \leq 10$	10
$10 < t \leq 20$	
$20 < t \leq 25$	
$25 < t \leq 30$	
$30 < t \leq 50$	

(2)
(Total 5 marks)

6. The table shows the number of computer games sold in a supermarket each month from January to June.

Jan	Feb	Mar	Apr	May	Jun
147	161	238	135	167	250

(a) Work out the three month moving averages for this information.

....

(2)

In a sale, a supermarket took 20% off its normal prices.
On Fun Friday, it took 30% off its sale prices.

Fred says, "That means there was 50% off the normal prices".

(b) Fred is wrong. Explain why.

(2)
(Total 4 marks)

7. The table gives information about the ages of 160 employees of an IT company.

Age (A) in years	**Frequency**
$15 < A \leq 25$	44
$25 < A \leq 35$	56
$35 < A \leq 45$	34
$45 < A \leq 55$	19
$55 < A \leq 65$	7

(a) Complete the cumulative frequency table.

Age (A) in years	**Cumulative Frequency**
$15 < A \leq 25$	
$15 < A \leq 35$	
$15 < A \leq 45$	
$15 < A \leq 55$	
$15 < A \leq 65$	

(1)

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

(2)

(c) Use your graph to find an estimate for

(i) the median age of the employees,

..... years

(ii) the interquartile range of the ages of the employees.

..... years

(3)

Another IT company has 80 employees.

The age of the youngest employee is 24 years.
The age of the oldest employee is 54 years.

The median age is 38 years.
The lower quartile age is 30 years.
The upper quartile age is 44 years.

(d) On the grid, draw a box plot to show information about the ages of the employees.

(2)

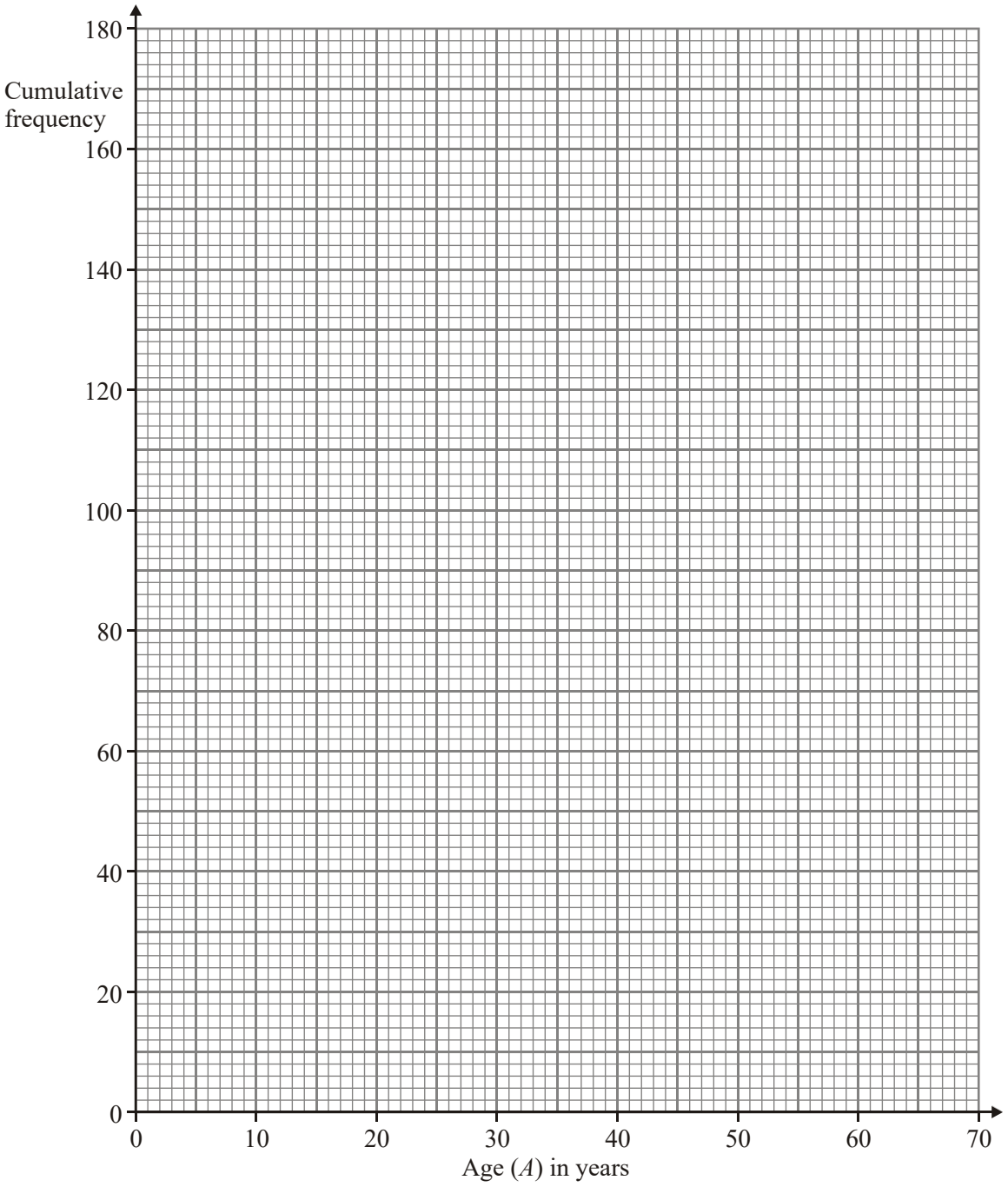
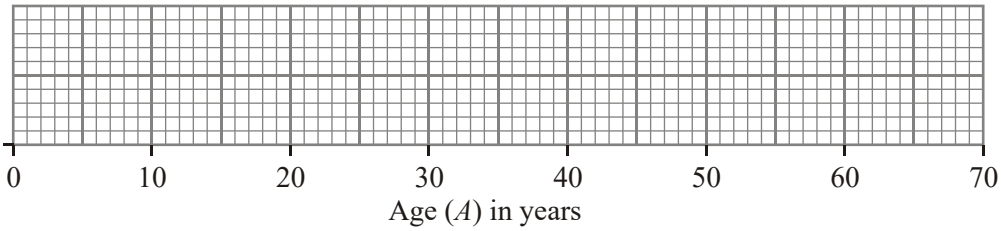
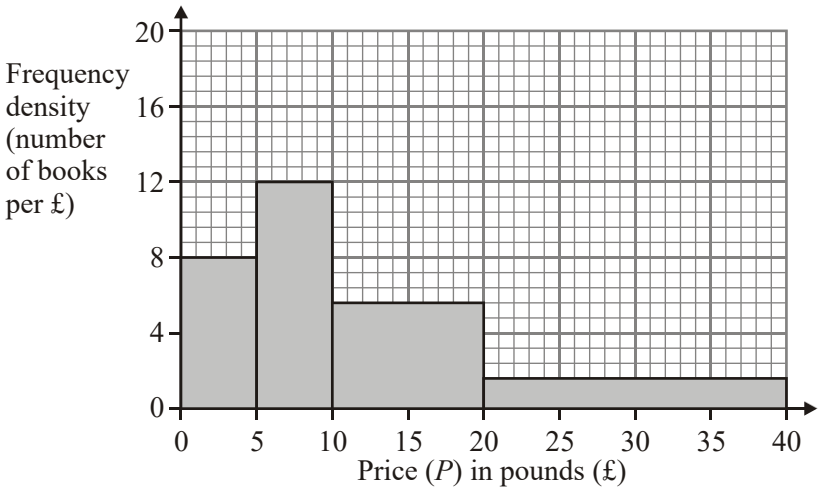

Cumulative frequency
180
160
140
120
100
80
60
40
20
0
0
10
20
30
40
50
60
70
Age (A) in years

Diagram for part (d).



(Total 8 marks)

8. This histogram gives information about the books sold in a bookshop one Saturday.



(a) Use the histogram to complete the table.

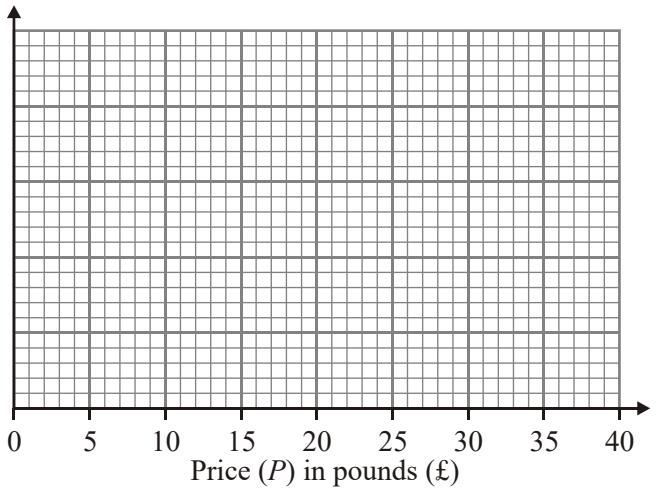
Price (P) in pounds (£)	**Frequency**
$0 < P \leq 5$	
$5 < P \leq 10$	
$10 < P \leq 20$	
$20 < P \leq 40$	

(2)

The frequency table below gives information about the books sold in a second bookshop on the same Saturday.

Price (P) in pounds (£)	**Frequency**
$0 < P \leq 5$	80
$5 < P \leq 10$	20
$10 < P \leq 20$	24
$20 < P \leq 40$	96

(b) On the grid below, draw a histogram to represent the information about the books sold in the second bookshop.



(3)
(Total 5 marks)

9. A youth club has 60 members.

40 of the members are boys.
20 of the members are girls.

The mean number of videos watched last week by all 60 members was 2.8
The mean number of videos watched last week by the 40 boys was 3.3

(a) Calculate the mean number of videos watched last week by the 20 girls.

.....

(3)

Ibrahim has two lists of numbers.
The mean of the numbers in the first list is p.
The mean of the numbers in the second list is q.

Ibrahim combines the two lists into one new list of numbers.

Ibrahim says 'The mean of the new list of numbers is equal to $\frac{p+q}{2}$.'

One of two conditions must be satisfied for Ibrahim to be correct.

(b) Write down each of these conditions.

Condition 1

.....

.....

Condition 2

.....

.....

(2)
(Total 5 marks)

10. The table shows information about the number of hours that 120 children used a computer last week.

Number of hours (h)	Frequency
$0 < h \leq 2$	10
$2 < h \leq 4$	15
$4 < h \leq 6$	30
$6 < h \leq 8$	35
$8 < h \leq 10$	25
$10 < h \leq 12$	5

(a) Work out an estimate for the mean number of hours that the children used a computer.
Give your answer correct to two decimal places.

……hours

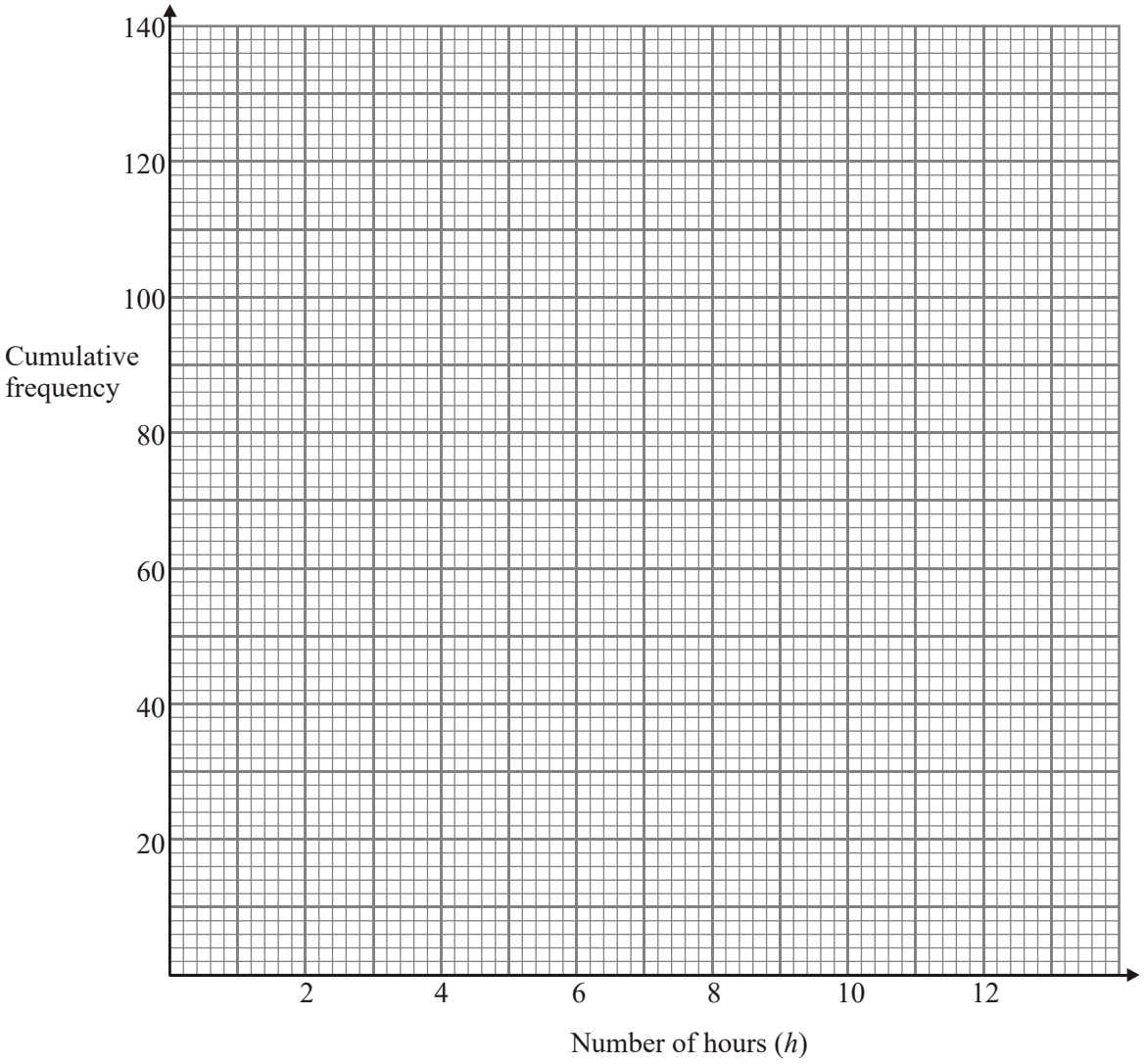
(4)

(b) Complete the cumulative frequency table.

Number of hours (h)	Cumulative frequency
$0 < h \leq 2$	10
$0 < h \leq 4$	
$0 < h \leq 6$	
$0 < h \leq 8$	
$0 < h \leq 10$	
$0 < h \leq 12$	

(1)

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



(2)

(d) Use your graph to find an estimate for the number of children who used a computer for **less** than 7 hours last week.

……

(2)

(Total 9 marks)

11. Bytes is a shop that sells computers and digital cameras.

In 2003, Bytes sold 620 computers.
In 2004, Bytes sold 708 computers.

(a) Work out the percentage increase in the number of computers sold.
Give your answer to an appropriate degree of accuracy.

..... %

(4)

In a sale, normal prices are reduced by 14%.

The sale price of a digital camera is £129.86

(b) Work out the normal price of the digital camera.

£ .....

(3)

The table shows the number of digital cameras Bytes sold each month in the first six months of 2005.

Month	January	February	March	April	May	June
Number of digital cameras sold	30	19	20	15	27	39

The first 3-month moving average for this data is 23

(c) Work out the **second** 3-month moving average for this data.

.....

(2)
(Total 9 marks)

12. Fred did a survey on the areas of pictures in a newspaper.
The table gives information about the areas.

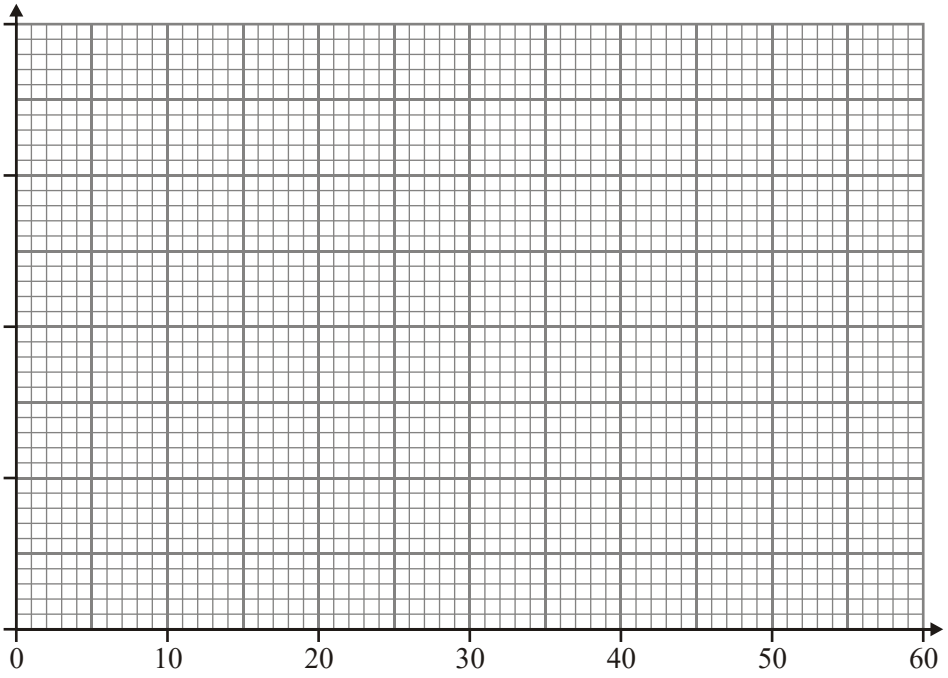
Area (A cm^2)	Frequency
$0 < A \leq 10$	38
$10 < A \leq 25$	36
$25 < A \leq 40$	30
$40 < A \leq 60$	46

(a) Work out an estimate for the mean area of a picture.

.....cm^2

(4)

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



(3)
(Total 7 marks)

13. A company tested 100 batteries.

The table shows information about the time in hours that the batteries lasted.

Time(t hours)	Frequency
$50 \leq t < 55$	12
$55 \leq t < 60$	21
$60 \leq t < 65$	36
$65 \leq t < 70$	23
$70 \leq t < 75$	8

(a) Complete the cumulative frequency table.

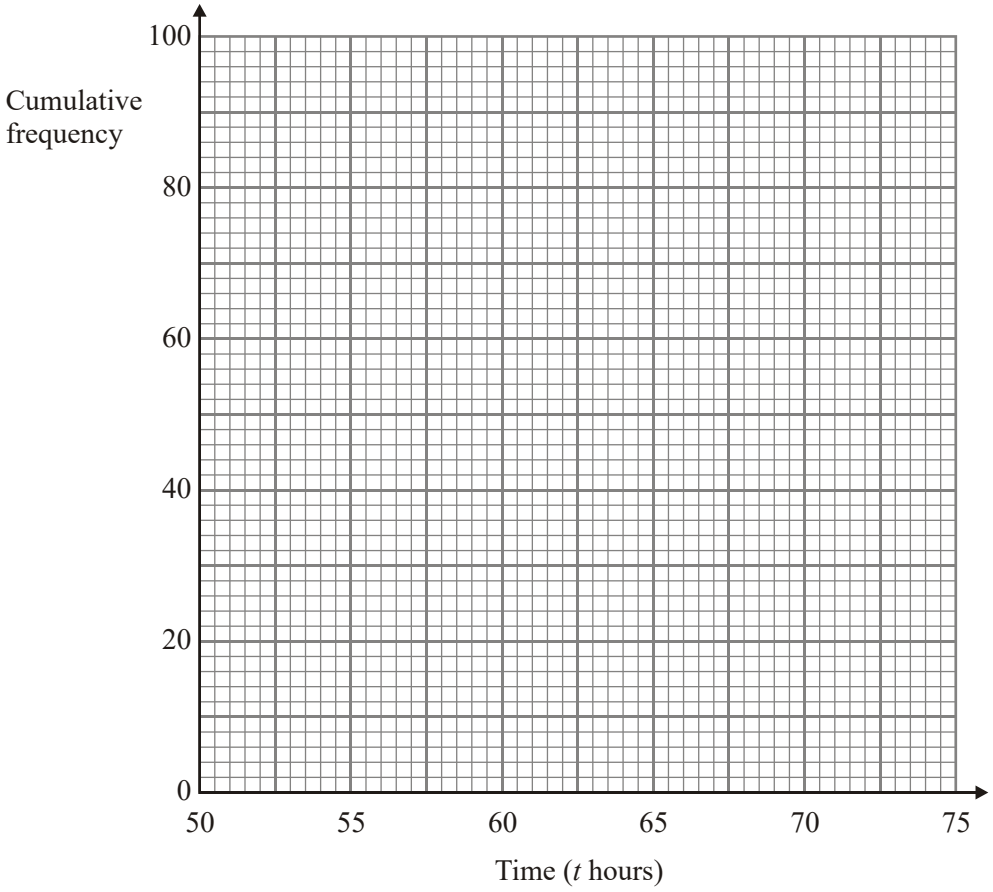
(1)

Time (t hours)	Cumulative frequency
$50 \leq t < 55$	12
$50 \leq t < 60$	
$50 \leq t < 65$	
$50 < t < 70$	
$50 \leq t < 75$	

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

(2)

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



……hours

(1)

(Total 4 marks)

14. A company tested 100 batteries.

The table shows information about the number of hours that the batteries lasted.

Time (t hours)	Frequency
$50 \leq t < 55$	12
$55 \leq t < 60$	21
$60 \leq t < 65$	36
$65 \leq t < 70$	23
$70 \leq t < 75$	8

(a) Complete the cumulative frequency table for this information.

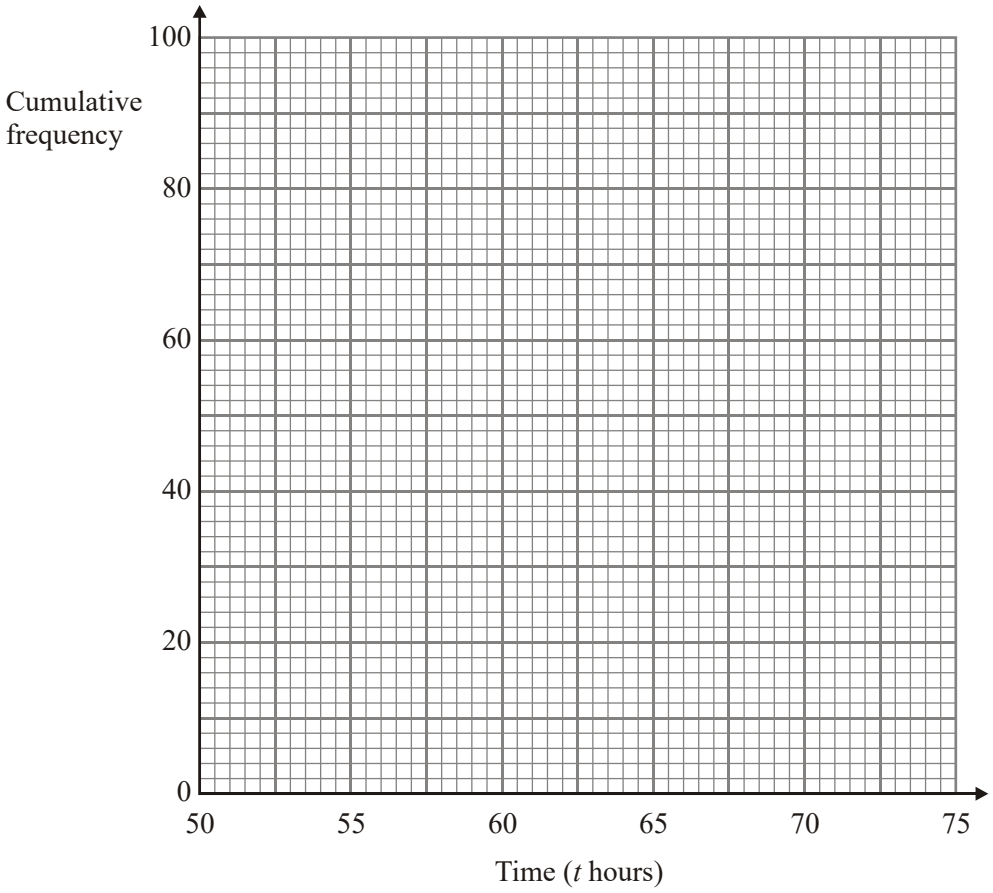
(1)

Time (t hours)	Cumulative frequency
$50 \leq t < 55$	12
$50 \leq t < 60$	
$50 \leq t < 65$	
$50 \leq t < 70$	
$50 \leq t < 75$	

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

(2)

(c) Use your completed graph to find an estimate for the median time.
You must state the units of your answer.



.....

(2)
(Total 5 marks)

15. The table and histogram show information about the length of time it took 165 adults to connect to the internet.

Time (t seconds)	Frequency
$0 < t \leq 10$	20
$10 < t \leq 15$	
$15 < t \leq 17.5$	30
$17.5 < t \leq 20$	40
$20 < t \leq 25$	
$25 < t \leq 40$	

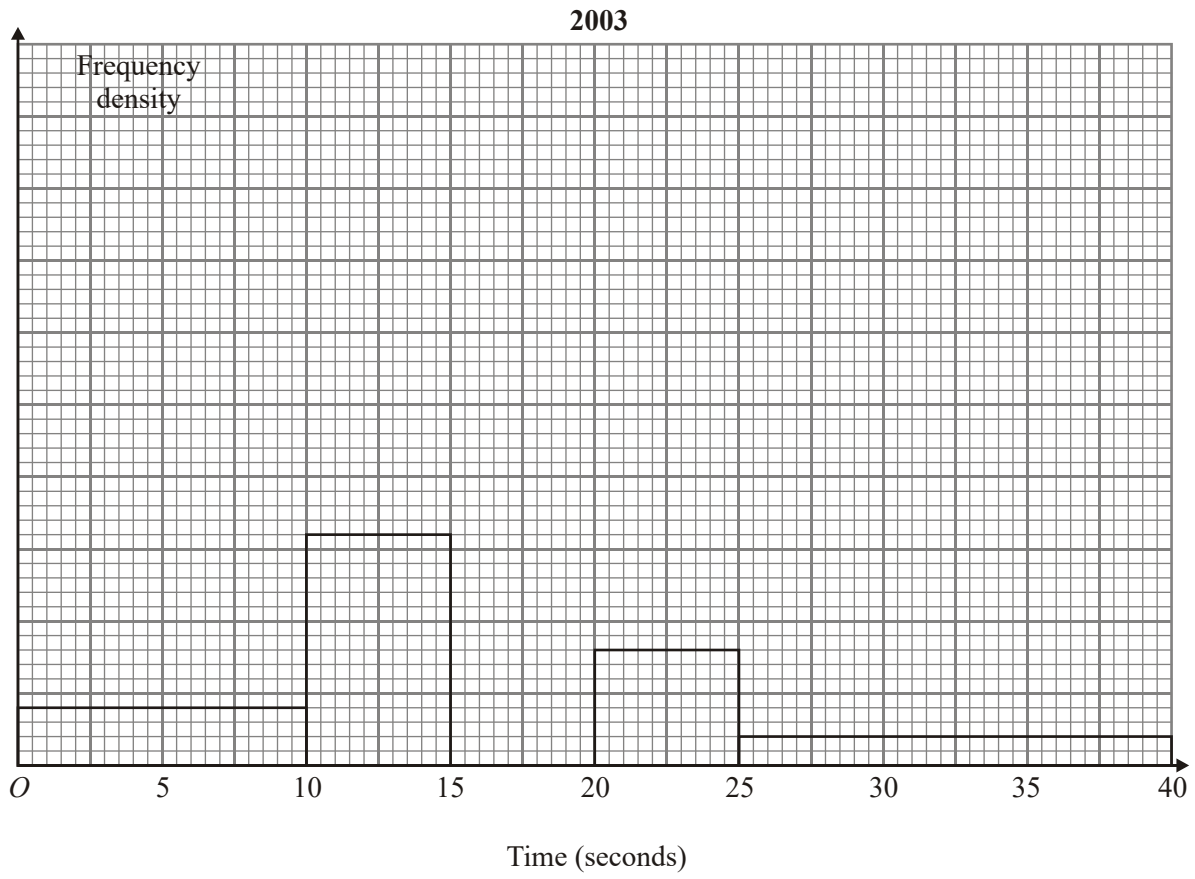
None of the adults took more than 40 seconds to connect to the internet.

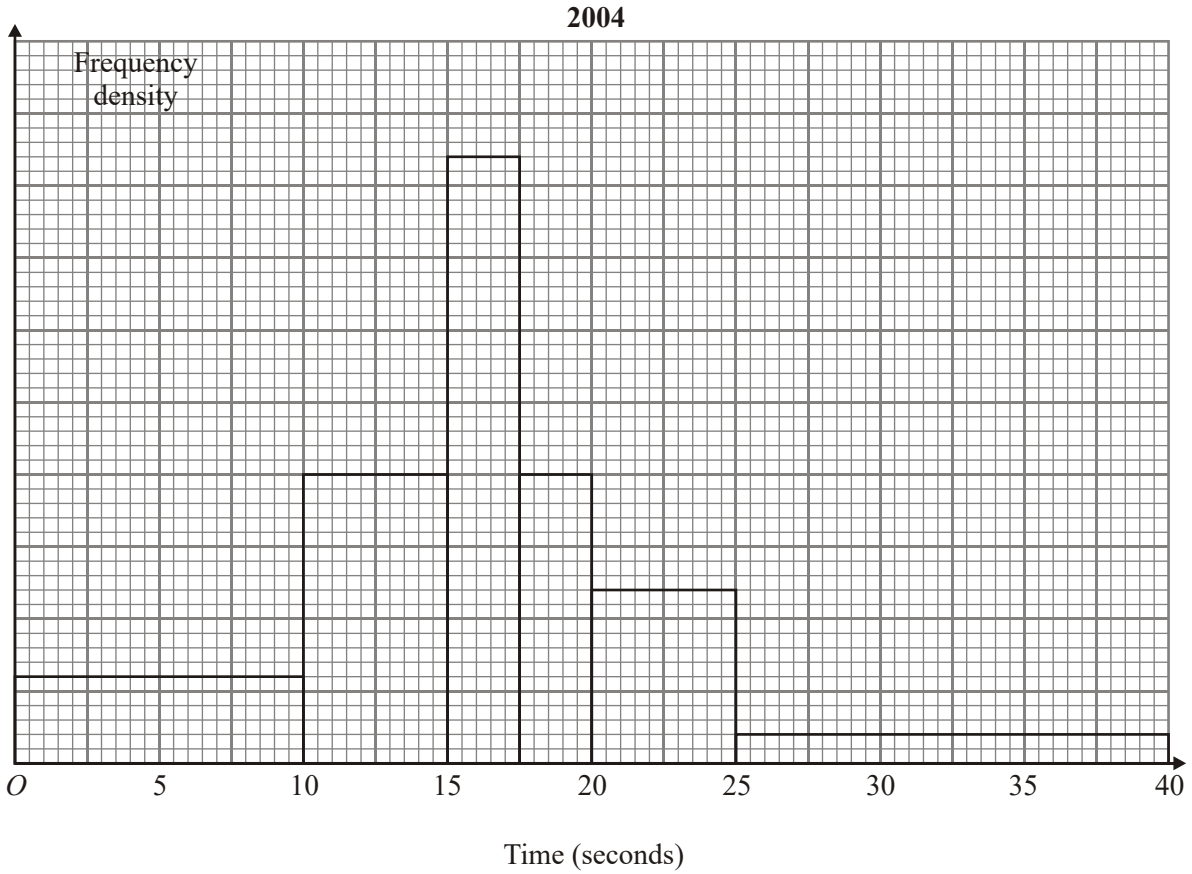
(a) Use the table to complete the histogram.

(2)

(b) Use the histogram to complete the table.

(2)





The histogram shows information about the time it took some children to connect to the internet.
None of the children took more than 40 seconds to connect to the internet.

110 children took up to 12.5 seconds to connect to the internet.

(c) work out an estimate for the number of children who took 21 seconds or more to connect to the internet.

.....

(3)
(Total 7 marks)

16. The table shows information about the ages of the 240 people at a club.

Age (*t* years)	**Frequency**
$15 \leq t < 20$	95
$20 \leq t < 25$	90
$25 \leq t < 30$	35
$30 \leq t < 35$	15
$35 \leq t < 40$	5

A pie chart is to be drawn for the information in the table.

(a) Work out the size of the angle for people in the class $20 \leq t < 25$

.....°

(2)

(b) Write down the modal class.

.....

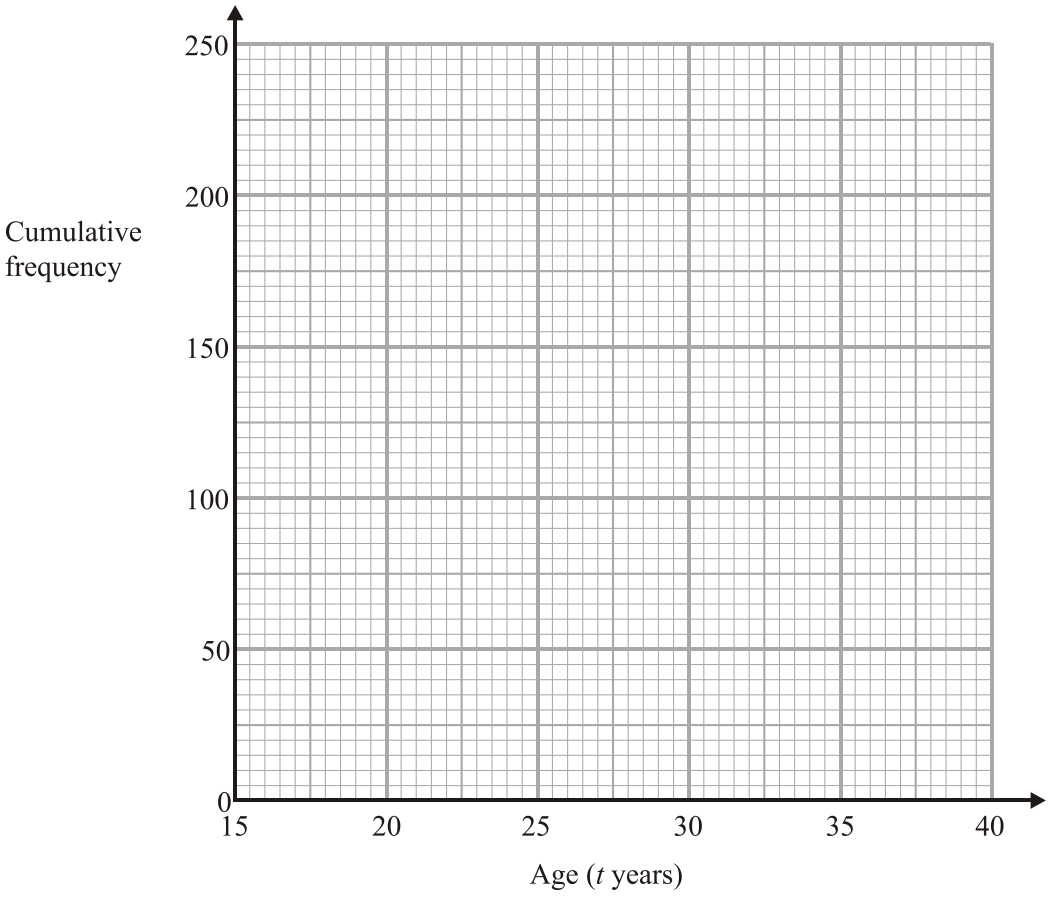
(1)

(c) Complete the cumulative frequency table.

Age (*t* years)	**Cumulative frequency**
$15 \leq t < 20$	
$15 \leq t < 25$	
$15 \leq t < 30$	
$15 \leq t < 35$	
$15 \leq t < 40$	

(1)

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



(2)

(e) Use your graph to find an estimate for the median age of the people.

..... years

(1)

(Total 7 marks)

17. The mean of eight numbers is 41
The mean of two of the numbers is 29

What is the mean of the other six numbers?

.....

(Total 3 marks)

18. Ali found out the number of rooms in each of 40 houses in a town.
He used the information to complete the frequency table.

Number of Rooms	Frequency	
4	4	
5	7	
6	10	
7	12	
8	5	
9	2	

Ali said that the mode is 9
Ali is wrong.

(a) Explain why.

.....

.....

(1)

(b) Calculate the mean number of rooms.

.....

(3)

(c) Beccy found out the number of rooms in each of 80 houses in the same town.
She used the information to complete the frequency table below.

Number of Rooms	Frequency
4	10
5	12
6	15
7	18
8	17
9	8

Find the median number of rooms.

.....

(1)

(d) The median number of rooms in Ali's table is 6

Which of the two medians, Ali's or Beccy's, is more likely to give the more reliable estimate for the median number of rooms for a house in this town?

.....

Give a reason for your answer.

.....

.....

(1)
(Total 6 marks)

19.

Month	Jan	Feb	Mar	Apr	May	Jun
Number of Televisions	1240	1270	1330	1300	1330	x

The table shows the number of televisions sold in a shop in the first five months of 2006.

(a) Work out the first 3-month moving average for the information in the table.

.....

(2)

The fourth 3-month moving average of the number of televisions sold in 2006 is 1350
The number of televisions sold in the shop in June was x.

(b) Work out the value of x.

x = ...

(2)
(Total 4 marks)

20. The table shows information about the amount spent by 100 customers in a supermarket.

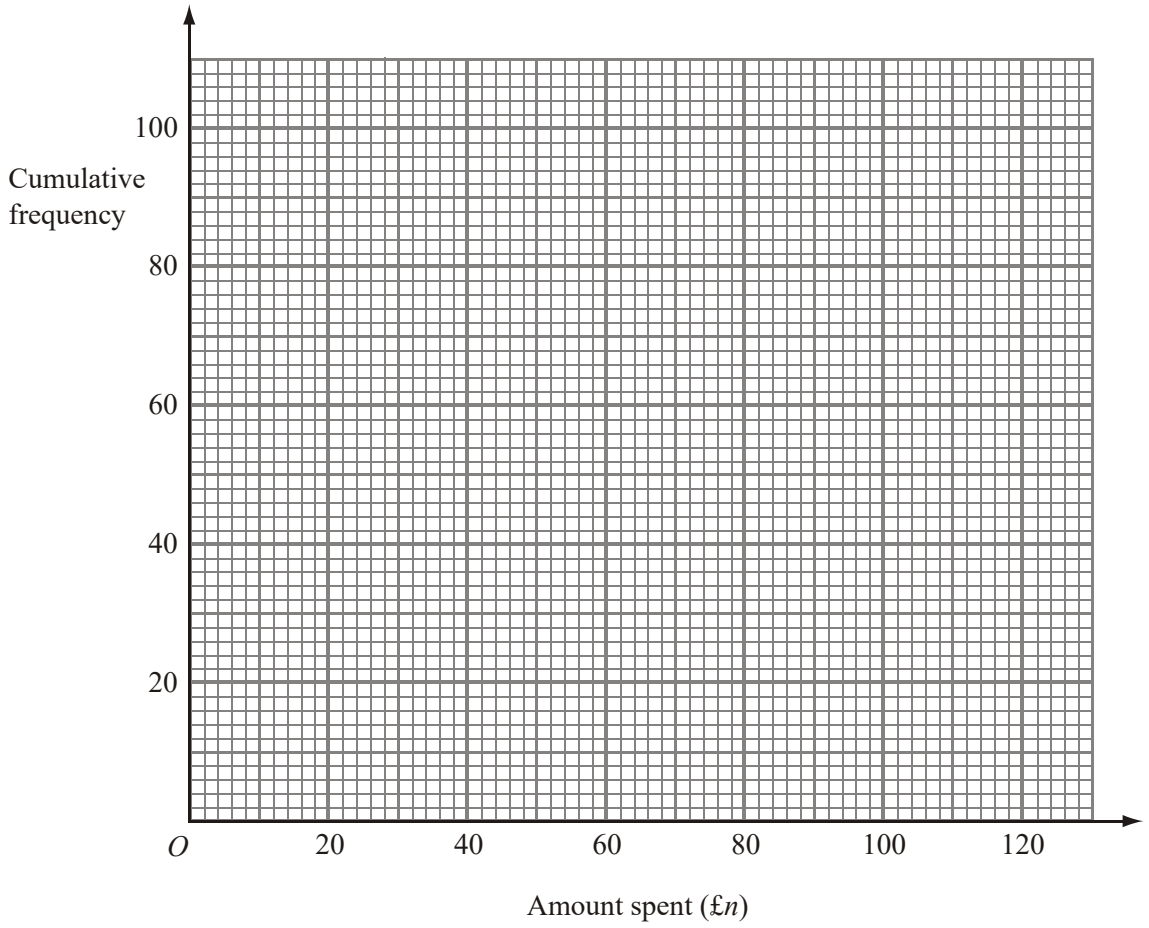
Amount spent (£n)	**Frequency**
$0 < n \leq 20$	18
$20 < n \leq 40$	22
$40 < n \leq 60$	35
$60 < n \leq 80$	15
$80 < n \leq 100$	8
$100 < n \leq 120$	2

(a) Complete the cumulative frequency table for this information.

Amount spent (£n)	**Cumulative frequency**
$0 < n \leq 20$	18
$0 < n \leq 40$	
$0 < n \leq 60$	
$0 < n \leq 80$	
$0 < n \leq 100$	
$0 < n \leq 120$	

(1)

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



(2)

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

£ .....

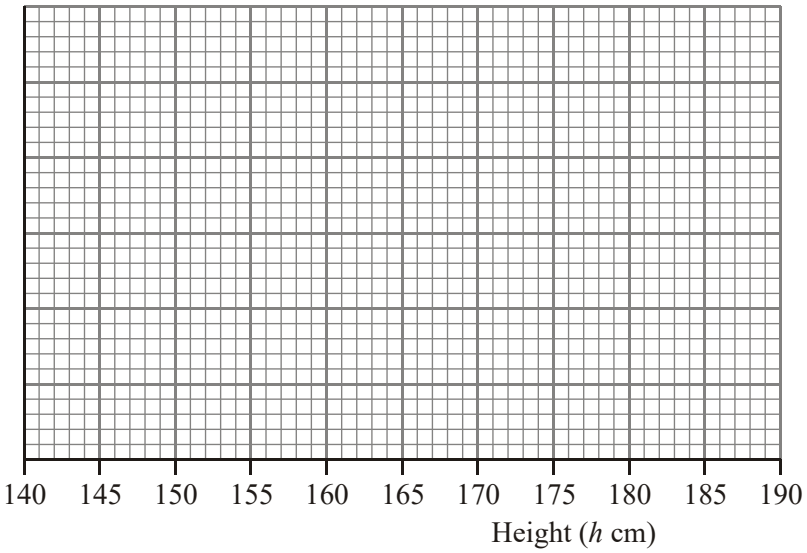
(1)

(Total 4 marks)

21. The table gives information about the heights, in centimetres, of some 15 year old students.

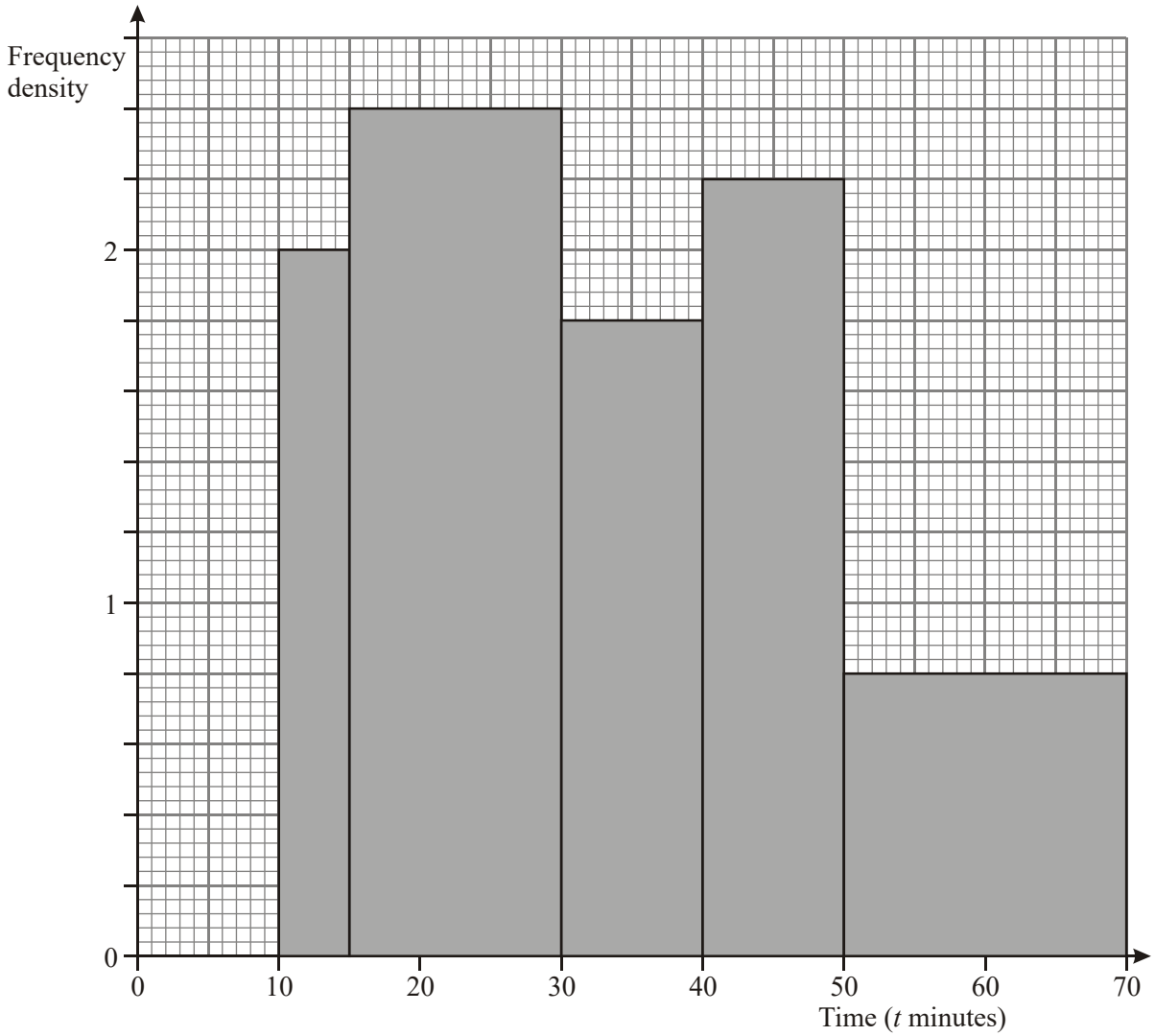
Height (h cm)	$145 < h \leq 155$	$155 < h \leq 175$	$175 < h \leq 190$
Frequency	10	80	24

Use the table to draw a histogram.



(Total 3 marks)

22. A teacher asked some year 10 students how long they spent doing homework each night.
The histogram was drawn from this information.



Use the histogram to complete the table.

Time (t minutes)	Frequency
$10 \leq t < 15$	10
$15 \leq t < 30$	
$30 \leq t < 40$	
$40 \leq t < 50$	
$50 \leq t < 70$	

(Total 2 marks)

23. Mary recorded the heights, in centimetres, of the girls in her class.

She put the heights in order.

132	144	150	152	160	162	162	167
167	170	172	177	181	182	182	

Find

(i) the lower quartile,

..... cm

(ii) the upper quartile.

..... cm

(Total 2 marks)

24. The table shows the number of orders received each month by a small company.

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
Number of orders received	23	31	15	11	19	16	20	13

Work out the first two 4-month moving averages for this data.

..... and .....

(Total 3 marks)

25. 90 students took an examination.
The grouped frequency table shows information about their results.

Mark (x)	Frequency
$0 < x \leq 10$	3
$10 < x \leq 20$	10
$20 < x \leq 30$	17
$30 < x \leq 40$	30
$40 < x \leq 50$	21
$50 < x \leq 60$	7
$60 < x \leq 70$	2

(a) Complete the cumulative frequency table.

Mark (x)	Cumulative Frequency
$0 < x \leq 10$	3
$0 < x \leq 20$	
$0 < x \leq 30$	
$0 < x \leq 40$	
$0 < x \leq 50$	
$0 < x \leq 60$	
$0 < x \leq 70$	

(1)

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

(2)

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

……..

(1)

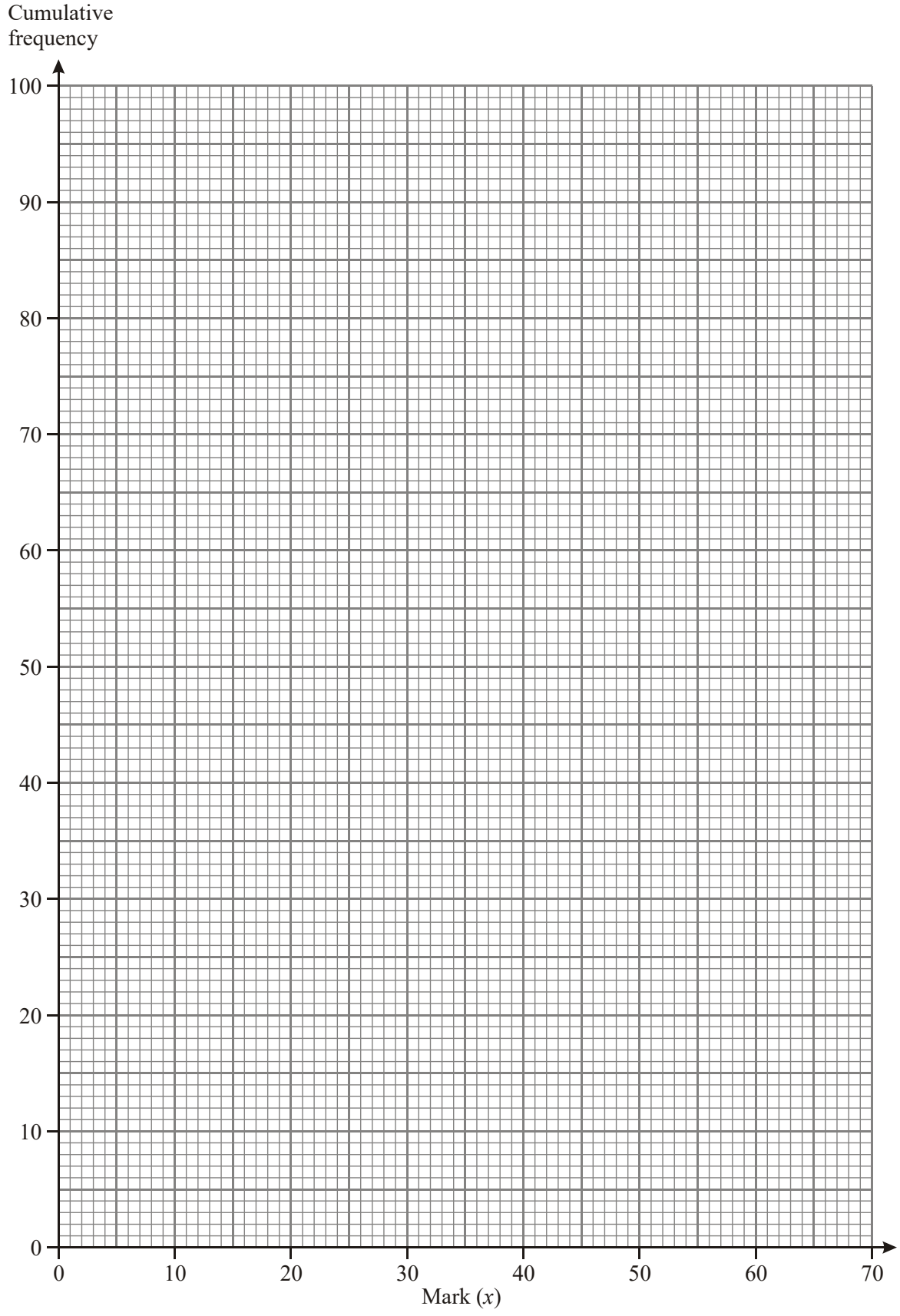
The pass mark for the examination was 28.

(d) Use your graph to find an estimate for the number of students who passed the examination.

……..

(2)

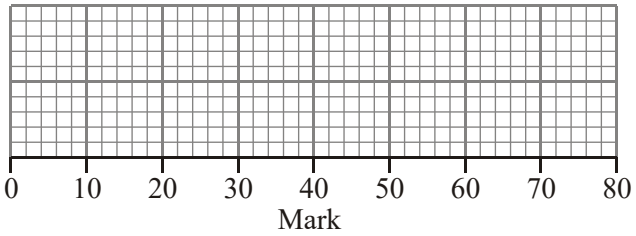
(Total 6 marks)


Cumulative frequency
100
90
80
70
60
50
40
30
20
10
0
0
10
20
30
40
50
60
70
Mark (x)

26. Some students took a test.
The table shows information about their marks.

Minimum mark	10
Lower quartile	33
Interquartile range	35
Median mark	43
Range	65

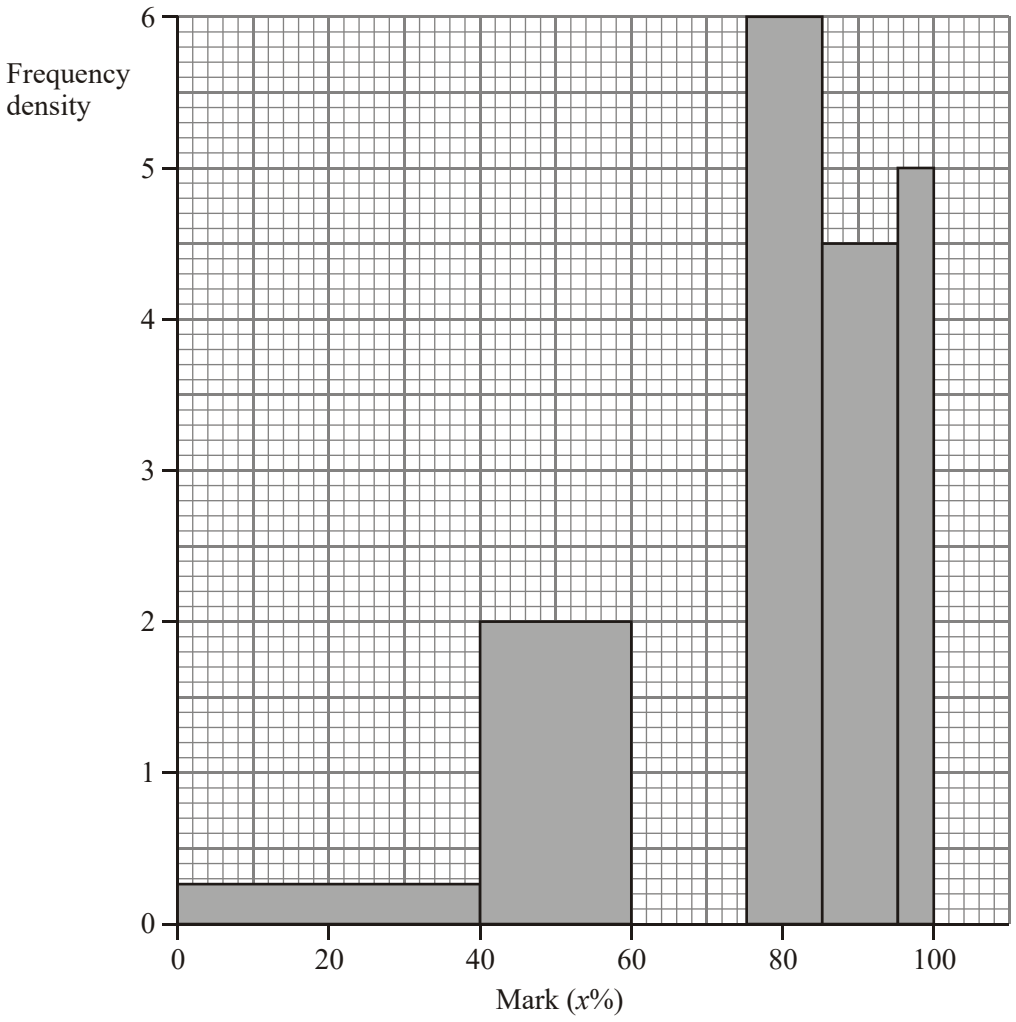
Use this information to draw a box plot.



(Total 3 marks)

27. Some students at Highfliers School took a mathematics examination.
The unfinished table and histogram show some information about their marks.

Mark (x%)	Frequency
$0 < x \leq 40$	10
$40 < x \leq 60$	40
$60 < x \leq 75$	45
$75 < x \leq 85$	60
$85 < x \leq 95$	
$95 < x \leq 100$	25



(a) Use the information in the table to complete the histogram.

(1)

(b) Use the information in the histogram to complete the table.

(1)
(Total 2 marks)

28. 60 office workers recorded the number of words per minute they could type.

The grouped frequency table gives information about the number of words per minute they could type.

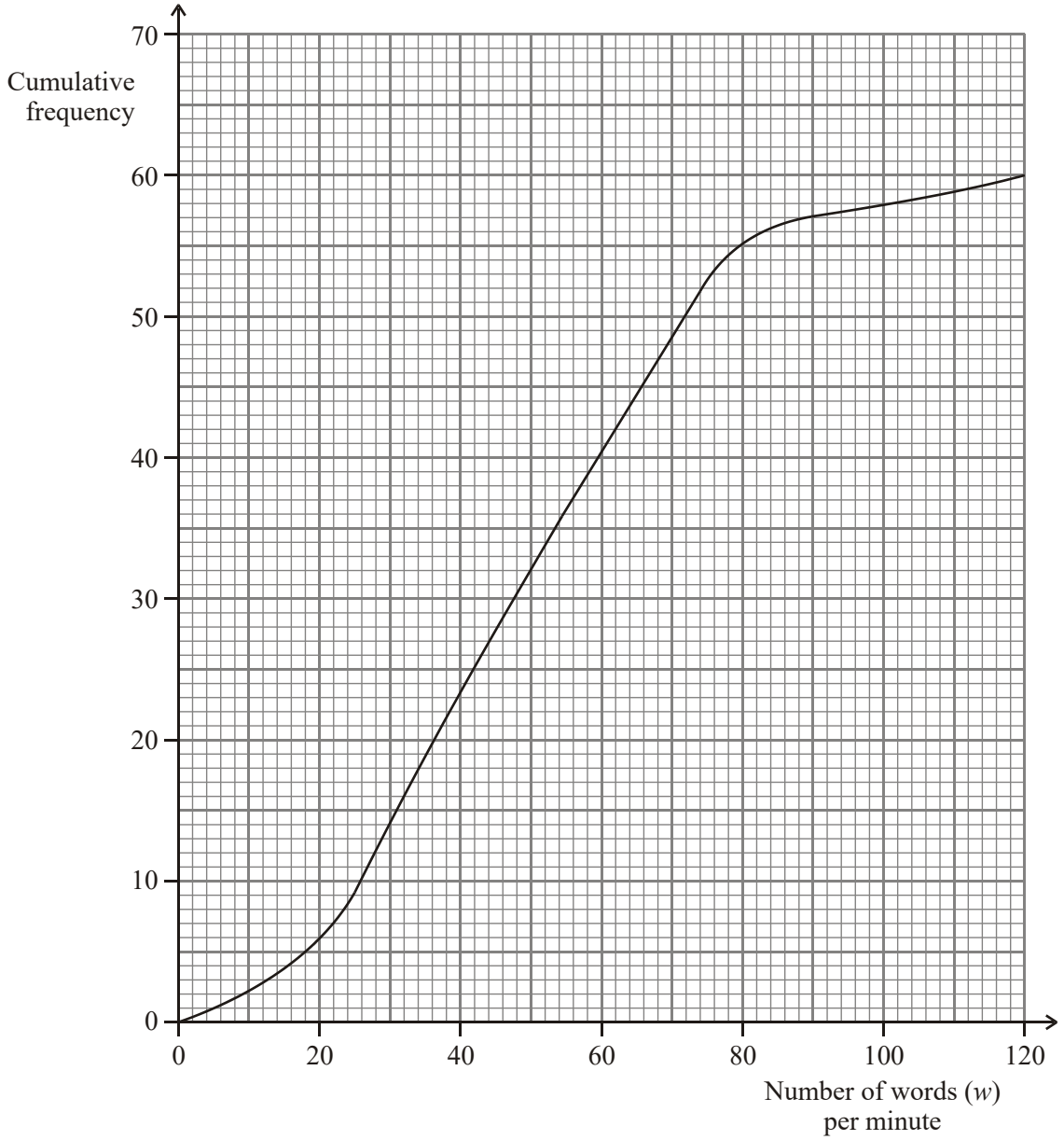
Number of words (w) per minute	Frequency
$0 \leq w < 20$	6
$20 \leq w < 40$	18
$40 \leq w < 60$	16
$60 \leq w < 80$	15
$80 \leq w < 100$	3
$100 \leq w < 120$	2

(a) Find the class interval in which the median lies.

.....

(2)

The cumulative frequency graph for this information has been drawn on the grid.



(b) Use this graph to work out an estimate for the interquartile range of the number of words per minute.

.....

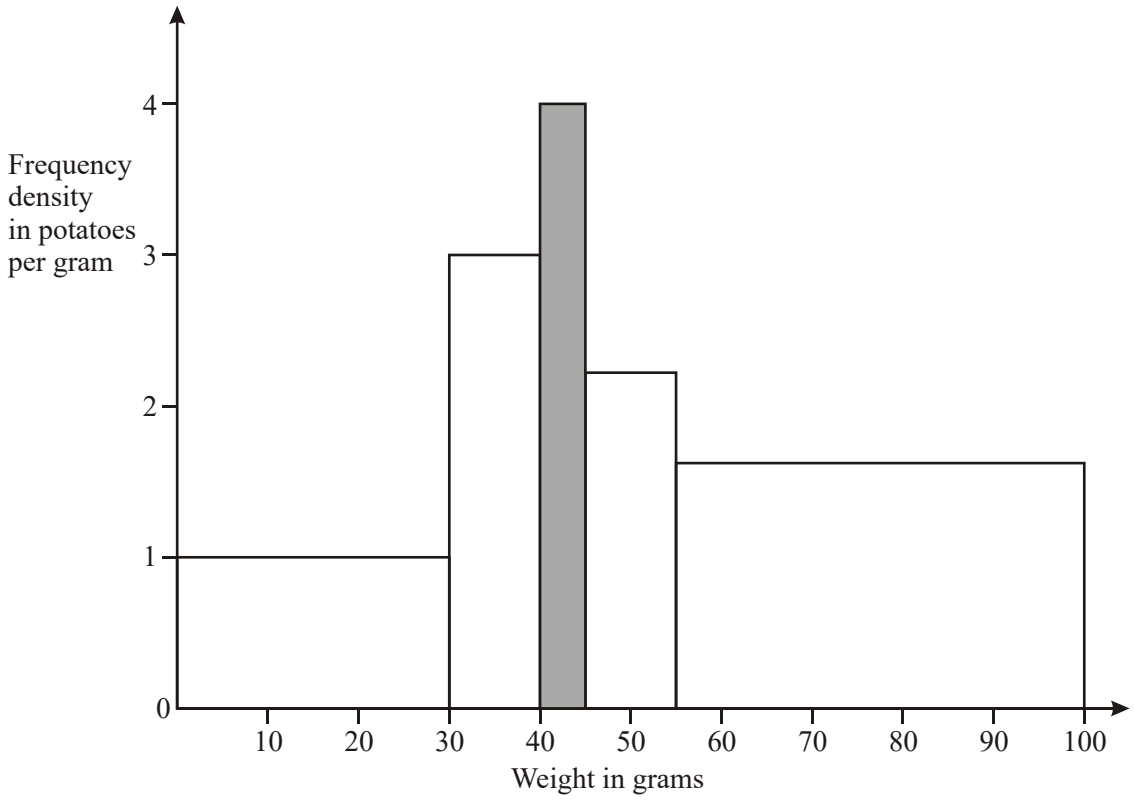
(2)

(c) Use this graph to work out an estimate for the number of workers who could type **more** than 70 words per minute.

.....

(2)
(Total 6 marks)

29.



The histogram gives information about the weights of some potatoes.
The shaded bar represents 20 potatoes.

(a) Work out how many of the potatoes weigh 30 grams or less.

.....

(1)

(b) Work out how many of the potatoes weigh more than 45 grams.

.....

(2)
(Total 3 marks)

30. A shop sells DVD players.

The table shows the number of DVD players sold in every three-month period from January 2003 to June 2004.

Year	Months	Number of DVD players sold
2003	Jan – Mar	58
	Apr – Jun	64
	Jul – Sep	86
	Oct – Dec	104
2004	Jan – Mar	65
	Apr – Jun	70

(a) Calculate the set of four-point moving averages for this data.

.....

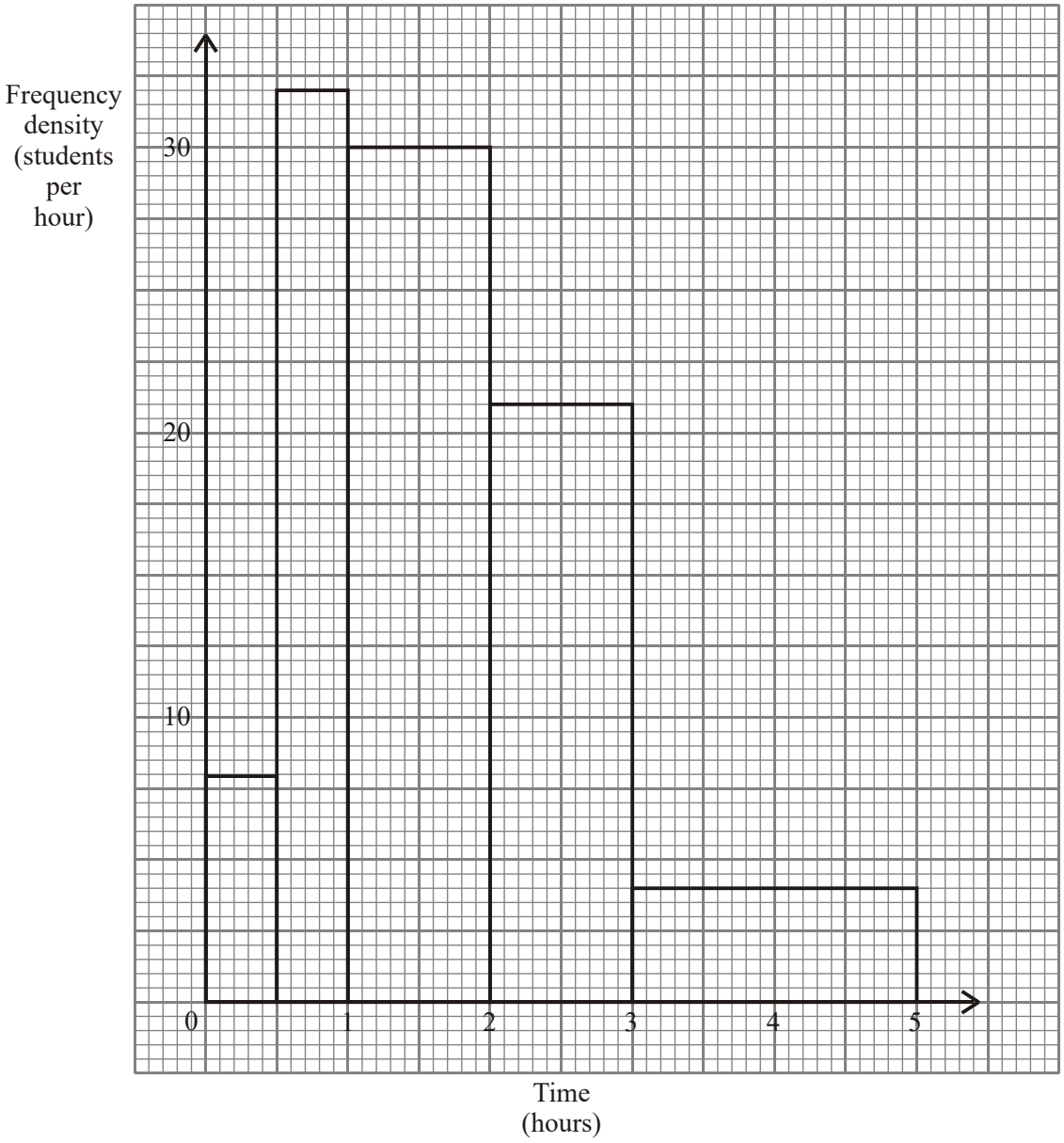
(2)

(b) What do your moving averages in part (a) tell you about the trend in the sale of DVD players?

.....

(1)
(Total 3 marks)

31. A teacher asked some students how much time they spent using a mobile phone one week.
The histogram was drawn from this information.



Use the histogram to complete the table.

Time (t) hours	Frequency
$0 \leq t < \frac{1}{2}$	
$\frac{1}{2} \leq t < 1$	
$1 \leq t < 2$	30
$2 \leq t < 3$	
$3 \leq t < 5$	

(Total 2 marks)

32. The table shows information about the number of hours that 120 children used a computer last week.

Number of hours (h)	Frequency
$0 < h \leq 2$	10
$2 < h \leq 4$	15
$4 < h \leq 6$	30
$6 < h \leq 8$	35
$8 < h \leq 10$	25
$10 < h \leq 12$	5

Work out an estimate for the mean number of hours that the children used a computer.
Give your answer correct to 2 decimal places.

…… hours

(Total 4 marks)

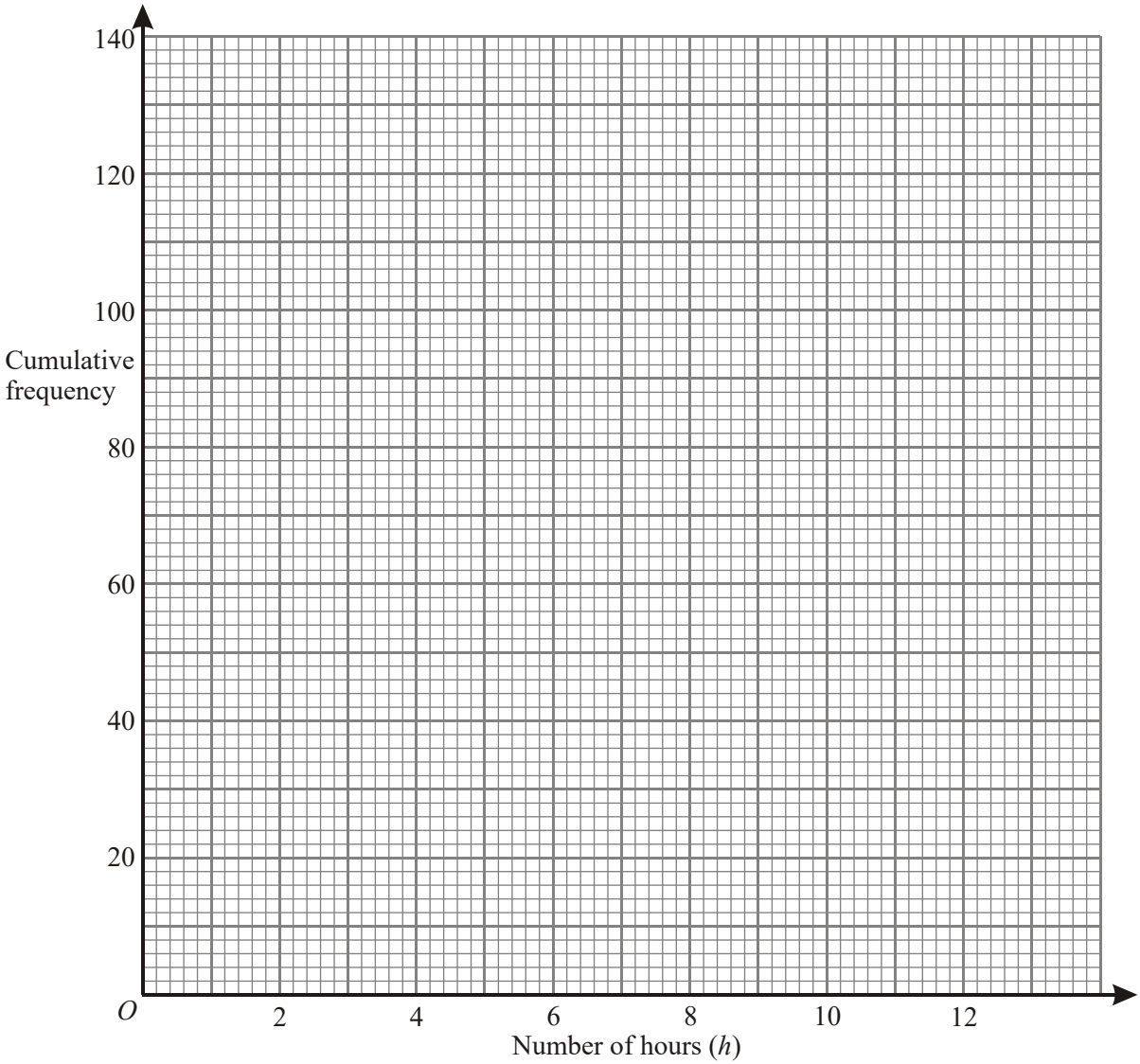
33. The table shows information about the number of hours that 120 children used a computer last week.

Number of hours (h)	Frequency
$0 < h \leq 2$	10
$2 < h \leq 4$	15
$4 < h \leq 6$	30
$6 < h \leq 8$	35
$8 < h \leq 10$	25
$10 < h \leq 12$	5

(a) Complete the cumulative frequency table.

Number of hours (h)	Cumulative frequency
$0 < h \leq 2$	10
$0 < h \leq 4$	
$0 < h \leq 6$	
$0 < h \leq 8$	
$0 < h \leq 10$	
$0 < h \leq 12$	

(1)



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

(2)

(c) Use your graph to find an estimate for the number of children who used a computer for **less** than 7 hours last week.

……...

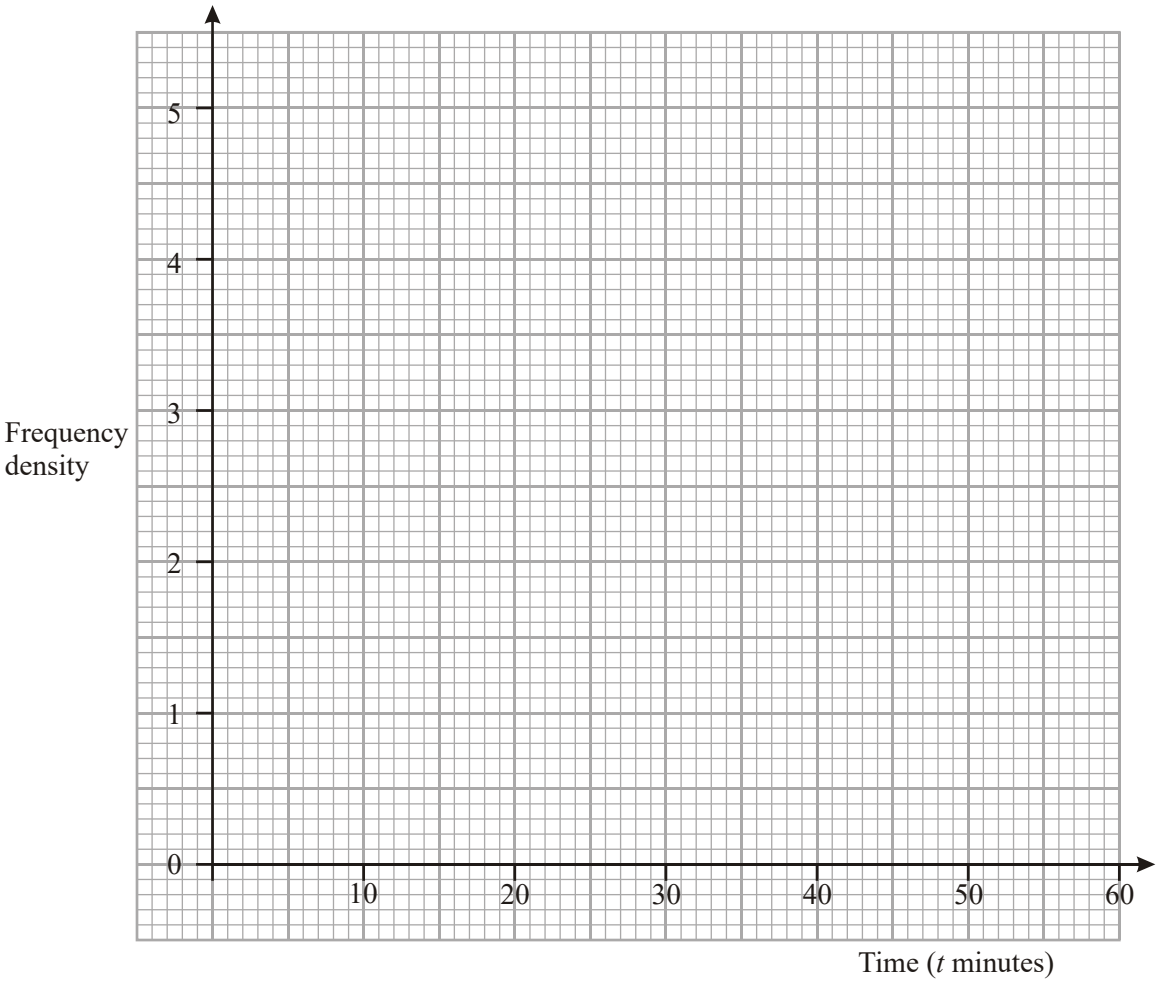
(2)

(Total 5 marks)

34. Kath recorded the times, in minutes, taken by 170 students to travel to school.
The table gives information about her results.

Time (t minutes)	Frequency
$0 \leq t < 20$	70
$20 \leq t < 35$	45
$35 \leq t < 45$	44
$45 \leq t < 50$	11

Use the information in the table to draw a histogram.



(Total 3 marks)

35. Paul and Carol open a new shop in the High Street.
The table shows the monthly takings in each of the first four months.

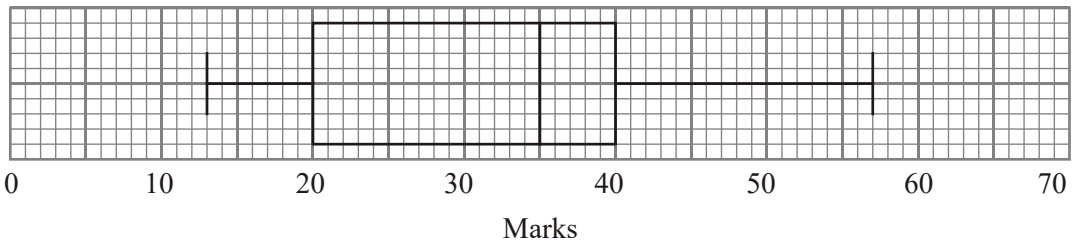
Month	Jan	Feb	March	April
Monthly takings (£)	9375	8907	9255	9420

Work out the 3-point moving averages for this information.

....

(2)
(Total 2 marks)

36. The box plot shows information about the marks scored in a test by some students.



(a) Write down the median mark.

.....

(1)

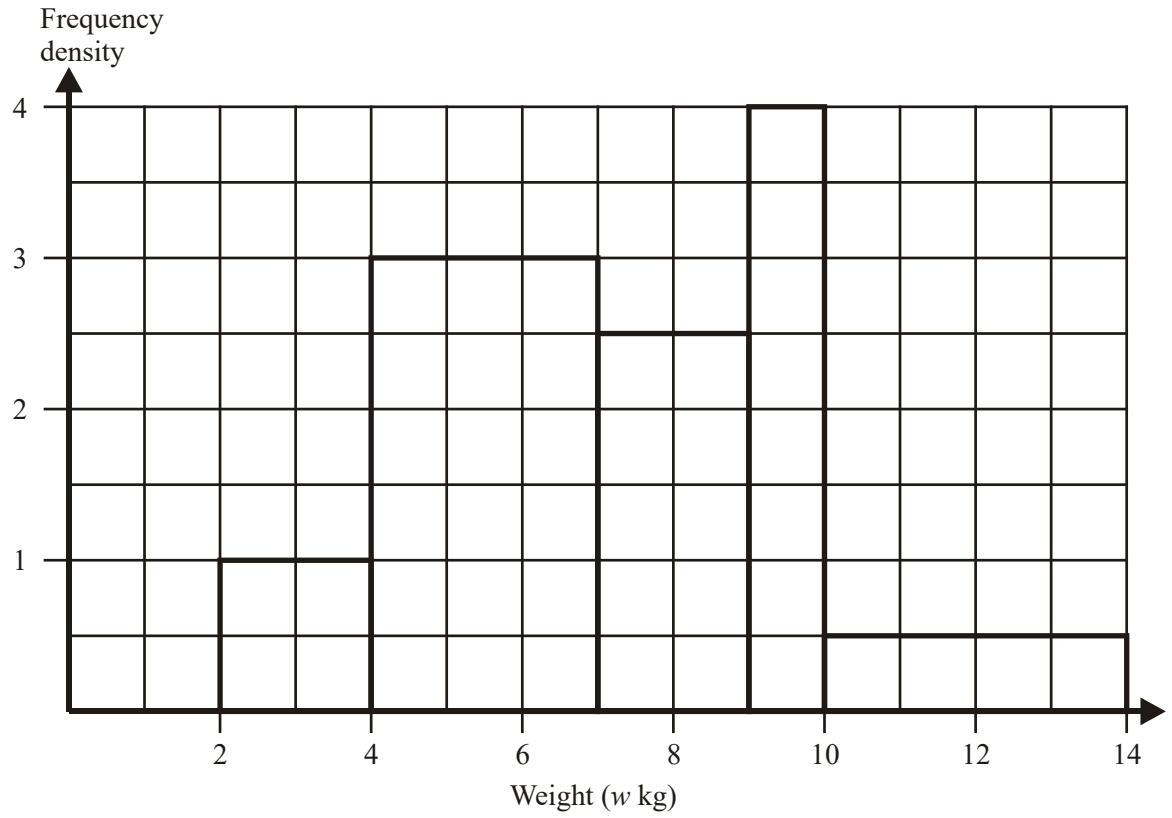
(b) Work out the range of the marks.

.....

(1)

(Total 2 marks)

37. The histogram gives information about the weights, in kilograms, of some boxes.



Use the histogram to complete the table.

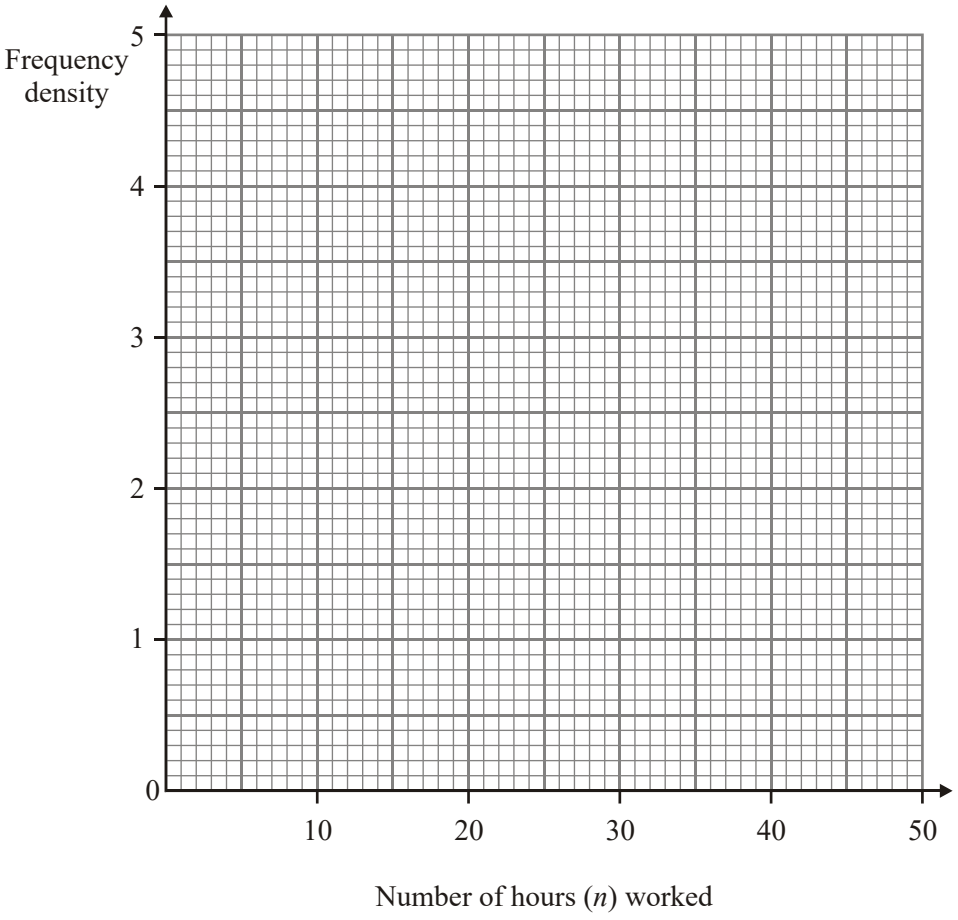
Weight (w kg)	Frequency
$2 \leq w < 4$	20
$4 \leq w < 7$	
$7 \leq w < 9$	
$9 \leq w < 10$	
$10 \leq w < 14$	

(Total 2 marks)

38. The table gives information about the number of hours worked by some factory workers.

Number of hours *(n)* worked	Frequency
$0 < n \leq 5$	15
$5 < n \leq 15$	42
$15 < n \leq 35$	40
$35 < n \leq 50$	6

Use the table to draw a histogram.



(Total 3 marks)

39. The owner of a music shop recorded the number of CDs sold every 3 months.

The table shows his records from January 2004 to June 2005.

Year	Months	Number of CDs
2004	Jan – Mar	270
	Apr – Jun	324
	Jul – Sept	300
	Oct – Dec	258
2005	Jan – Mar	309
	Apr – Jun	335

(a) Calculate the complete set of four-point moving averages for this information.

....

(2)

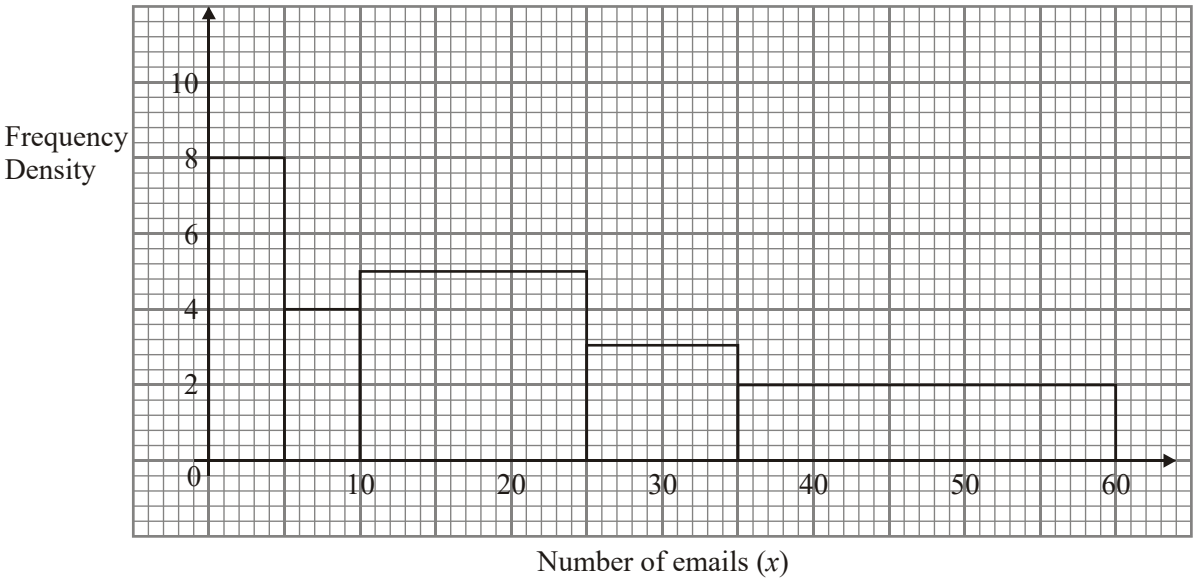
(b) What trend do these moving averages suggest?

.....

(1)

(Total 3 marks)

40. The histogram and table show information about the number of emails received by each of the students in a school.



Number of emails (x)	Frequency
$0 < x \leq 5$	
$5 < x \leq 10$	20
$10 < x \leq 25$	
$25 < x \leq 35$	
$35 < x \leq 60$	

Use the information in the histogram to complete the table.

(Total 2 marks)

41. The table shows some information about student absences.

Term	Autumn 2003	Spring 2004	Summer 2004	Autumn 2004	Spring 2005	Summer 2005
Number of absences	408	543	351	435	582	372

Work out the three-point moving averages for this information. The first two have been done for you.

434, 443, ……., …….

(Total 2 marks)

42. The table and histogram show information about the length of time it took 165 adults to connect to the internet.

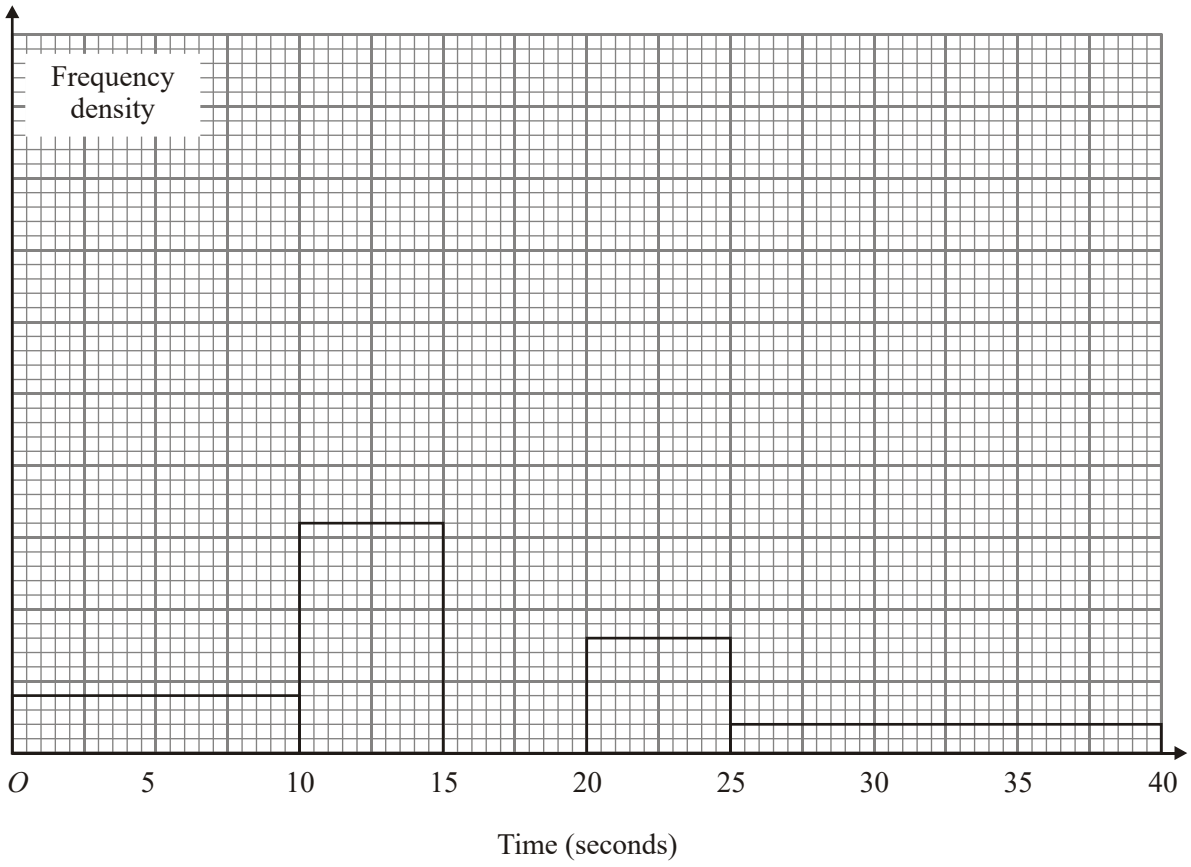
Time (t seconds)	Frequency
$0 < t \leq 10$	20
$10 < t \leq 15$	
$15 < t \leq 17.5$	30
$17.5 < t \leq 20$	40
$20 < t \leq 25$	
$25 < z \leq 40$	

None of the adults took more than 40 seconds to connect to the internet.

(a) Use the table to complete the histogram.

(2)

(b) Use the histogram to complete the table.



(2)
(Total 4 marks)

43. The table shows some information about the areas of 50 gardens.

Area of garden (A m^2)	**Number of gardens (f)**		
$0 < A \leq 20$	4		
$20 < A \leq 40$	7		
$40 < A \leq 60$	10		
$60 < A \leq 80$	22		
$80 < A \leq 100$	7		

Calculate an estimate for the mean area of these gardens.

..... m^2

(Total 4 marks)

44. The table shows the number of pairs of shoes sold in a shop each month from July to December.

July	August	September	October	November	December
248	255	235	260	261	298

(a) Work out the 3-point moving averages for this information.
The first one has been worked out for you.

246, ..., ..., ...

(2)

(b) What do your moving averages in part (a) tell you about the sale of shoes from July to December?

.....

.....

(1)
(Total 3 marks)

45. Jasmine sells soft drinks.
She recorded the number of drinks she sold from July to December.

The table shows this information.

July	August	September	October	November	December
340	352	336	272	256	264

Work out the 4-month moving averages for this information.

The first one has been worked out for you.

325, ..., ...

(Total 2 marks)

46. Joe owns a small shop.
The table shows his sales, in £, in the eight 3-month periods for the last two years.

		3-month period	**Sales in £**
Year 1	1	January to March	3420
	2	April to June	3370
	3	July to September	3750
	4	October to December	4020
Year 2	5	January to March	3940
	6	April to June	3810
	7	July to September	4230
	8	October to December	4560

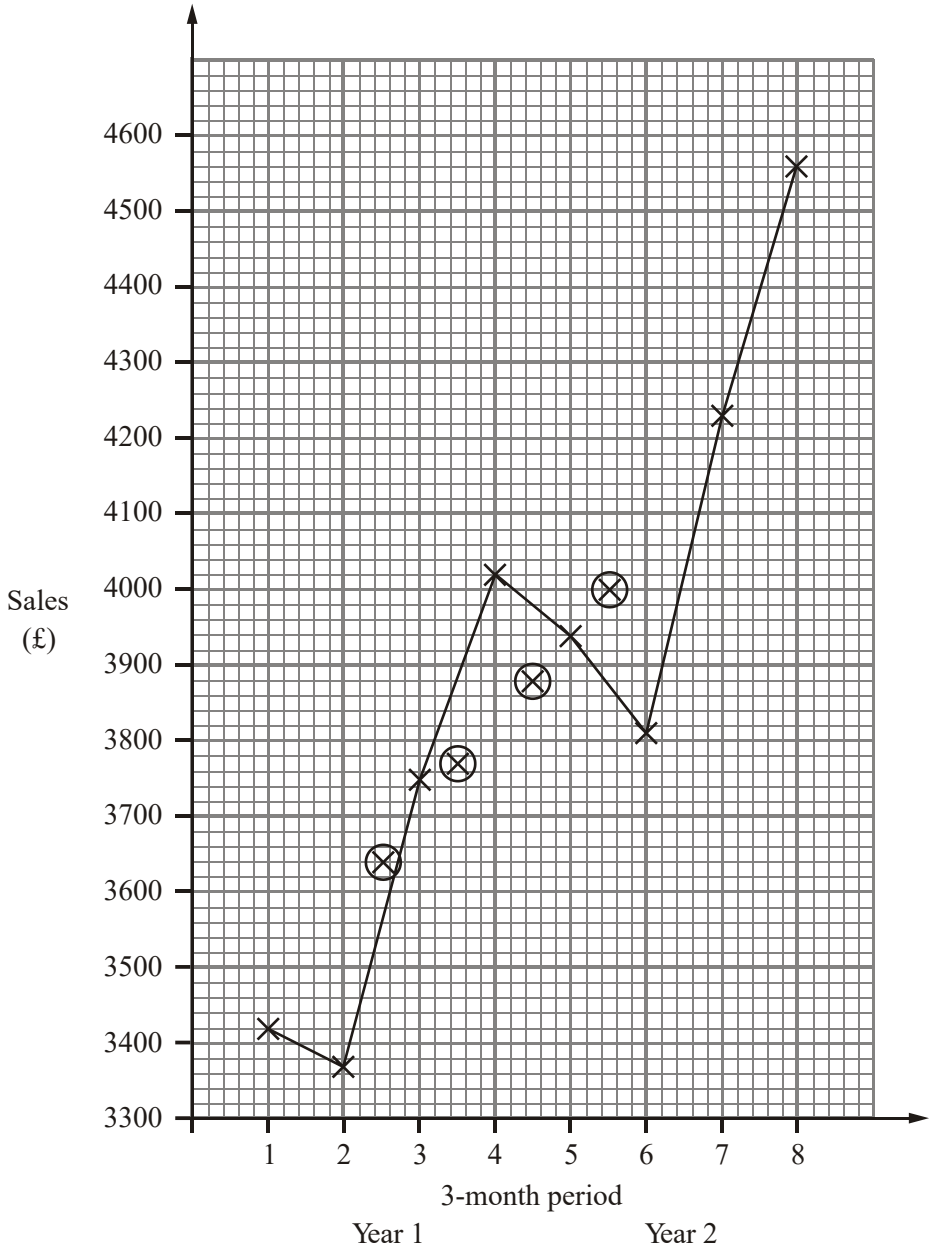
The first four 4-point moving averages have been worked out.

(a) Work out the fifth 4-point moving average.

£3640, £3770, £3880, £4000, £.....

(2)

The time series graph shows Joe's sales for the last two years.
The first four 4-point moving averages have been plotted on the grid.



(b) Plot the fifth 4-point moving average.

(1)

(c) Draw a trend line for this data.

(1)
(Total 4 marks)

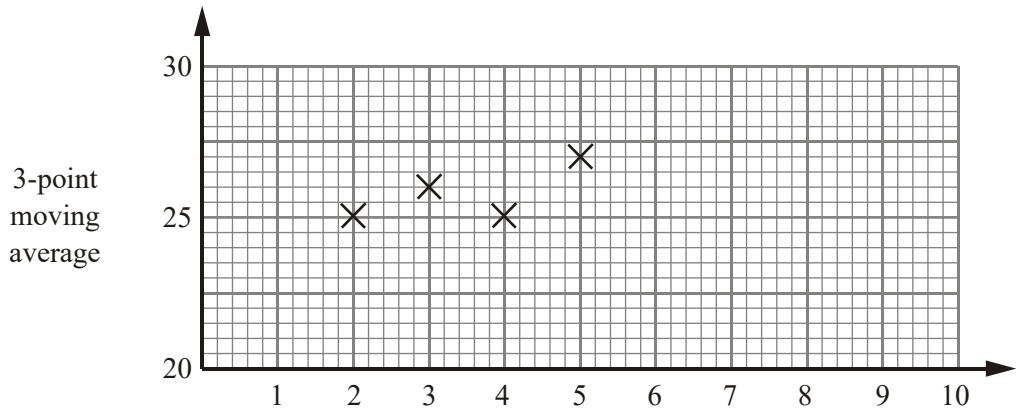
47. The table shows the number of pupils at a dance class each week for 10 weeks.
The table also shows seven of the 3-point moving averages.

Week	1	2	3	4	5	6	7	8	9	10
Number of Pupils	23	25	27	26	22	33	23	25	30	29
3-point moving average		25	26	25	27	26	27	26		

(a) Work out the missing 3-point moving average.
Write your answer in the table.

(2)

(b) On the grid, plot the 3-point moving averages from the table.
The first four have been plotted for you.



(1)

(c) On the grid, draw a trend line.

(1)

(d) Comment on the trend shown by your graph.

.....

.....

(1)
(Total 5 marks)

48. The table shows the number of televisions sold each month by a shop.

Month	April	May	June	July	Aug	Sept	Oct
Number of televisions	163	100	118	99	63	92	74

(a) Work out the four-point moving averages for this information.
The first three have been worked out for you.

.....120..... .....95..... .....93..... .....

(2)

(b) Use the moving averages to describe the trend.

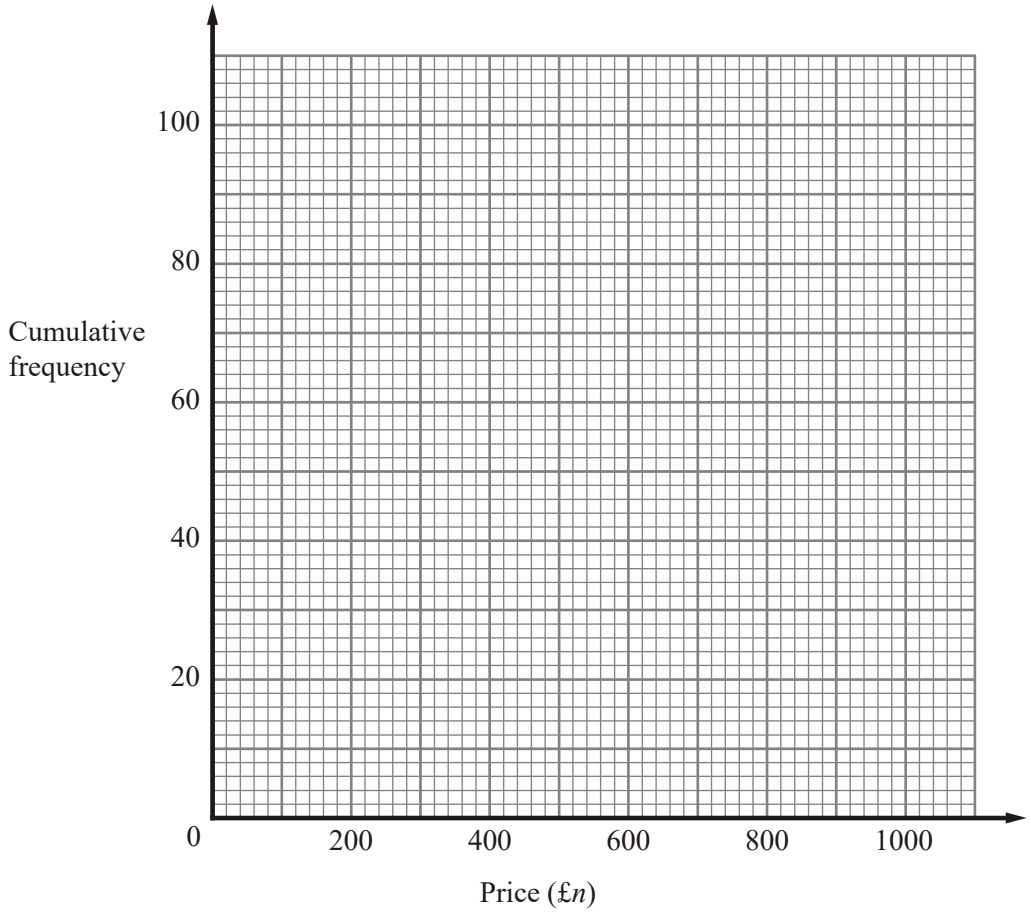
.....

(1)

The **cumulative frequency** table shows information about the prices, in £, of 100 televisions.

Price (£*n*)	**Cumulative frequency**
$0 < n \leq 200$	5
$0 < n \leq 400$	20
$0 < n \leq 600$	40
$0 < n \leq 800$	75
$0 < n \leq 1000$	100

(c) On the grid below, draw a cumulative frequency graph for the table.



(2)

(d) Use your graph to find an estimate for the median price of these televisions.

£ .....

(1)
(Total 6 marks)

49. The table shows the number of births in a hospital from 2000 to 2005

Year	2000	2001	2002	2003	2004	2005
Number of births	608	595	597	623	640	639

(a) Work out the 3-point moving averages for this information.

The first three have been done for you.

600, 605, 620, ...

(2)

(b) Use these moving averages to describe the trend.

.....

(1)
(Total 3 marks)

50. The table gives some information about the area, in km^2, of 30 countries.

Area (n million km^2)	**Frequency**
$0.00 < n \leq 0.25$	4
$0.25 < n \leq 0.50$	9
$0.50 < n \leq 0.75$	4
$0.75 < n \leq 1.00$	5
$1.00 < n \leq 1.25$	6
$1.25 < n \leq 1.50$	1
$1.50 < n \leq 1.75$	1

(a) Write down the modal class interval.

.....

(1)

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

.....

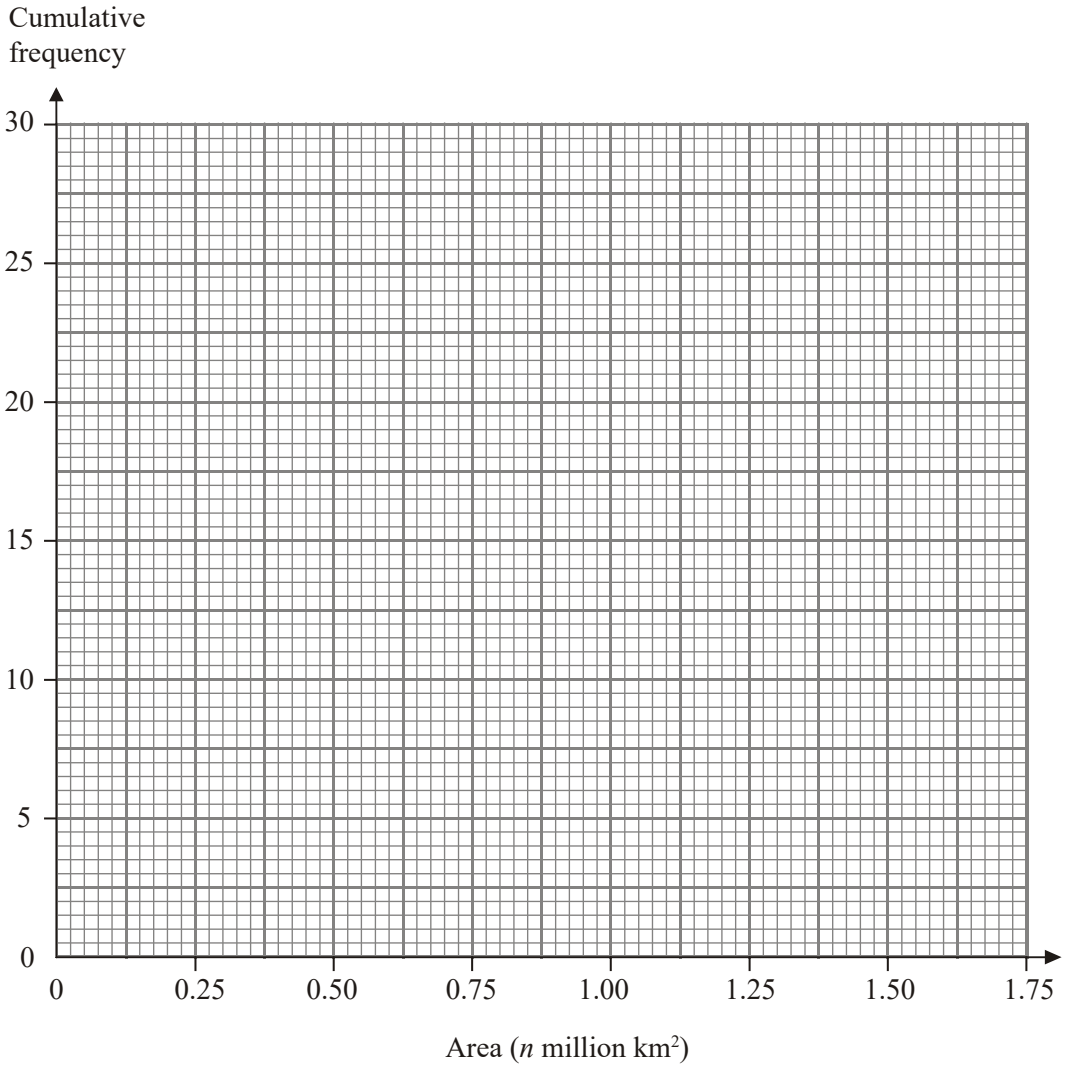
(1)

(c) Complete the cumulative frequency table.

Area (n million km^2)	**Frequency**
$0.00 < n \leq 0.25$	4
$0.00 < n \leq 0.50$	
$0.00 < n \leq 0.75$	
$0.00 < n \leq 1.00$	
$0.00 < n \leq 1.25$	
$0.00 < n \leq 1.50$	
$0.00 < n \leq 1.75$	

(1)

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



(2)

(e) Use your graph to find an estimate for the number of these countries with an area greater than 0.90 million km^2.

.....

(2)
(Total 7 marks)

01. (a) (i) 152 2

B1 cao

(ii) 177

B1 cao

(b) 3

B1 for median marked at 167
B1 ft for postion of box with its ends at "152" and "177"
B1 for position of whiskers with ends at 132 and 182
NB: For any points plotted between 141 and 149 give a tolerance of an extra ± 1 square

[5]

02. (a) 60
40 2

B1 cao
B1 cao

(b) correct bars 2

B1 for $30 < x \leq 40$ with an area of 2½ squares
B1 for $40 < x \leq 70$ with an area of 3 squares
SC: $\frac{0}{4}$ give M1 if clearly using area or frequency density

[4]

03. (a) $150 < C \leq 200$ 2

M1 use of cum freq to find the cost of the 20^{th} or 20.5^{th} car
OR $\frac{1}{2}\Sigma f$ or $\frac{1}{2}(\Sigma f + 1)^{th}$ car
A1 eg 150 to 200, 150 – 200

(b) No, because the 21^{st} value is in the same interval 1

B1 20.5^{th} or 21^{st} vakue in same internal consistent with 'a'
OR
Refers to the median value being low in the interval
(statement to be mathematically correct)

(c) 6500 3

80% = 5200

$\frac{5200}{80} \times 100$

M1 for (100 – 20) % = 5200

M1 for $\frac{5200}{"80"} \times 100$

A1 cao

[6]

04. (a) 5, 23, 35, 39, 40 1

B1 for all correct

(b) Points correct
(175,5), (180,23),(185,35), (190,39) and (195,40) 2

Curve or line segments

B1 ft for at least 4 of 5 pts plotted correctly (± ½ sq) at ends of intervals dep on sensible table
B1 ft (dep on previous B1) for pts joined by curve/line segments provided no gradient is negative
*(SC:B1 ft from sensible table for 4 or 5 pts plotted not at ends but consistently within each interval **and** joined)*

(c) ~179 1

B1 ft from cf graph using cf = 20 or 20.5

[4]

05. (a) Frequency densities of 8 ÷ 10 = 0.8
16 ÷ 10 = 1.6, 15 ÷ 5 = 3, 12 ÷ 5 = 2.4
6 ÷ 20 = 0.3 3

B1+ B1 + B1 for each correct column shown on histogram
If B0, then M1 for clear attempt to use frequency density or area

(b) 18, 14, 10, 8 2

$1.8 \times 10 = 18$, $2.8 \times 5 = 14$, $2 \times 5 = 10$, $0.4 \times 20 = 8$

B2 all correct
B1 2 or 3 correct
5
□ 5 =
$\frac{25}{80}$ = 2.5 birds

[5]

06. (a) 182, 178, 180, 184 2

M1 mean of any three consecutive months, eg (147 + 161 + 238) ÷ 3 oe
A1 cao

(b) Sale price = 80%
Fun Friday price = 70% of 80% = 56% (oe) 2

B1 B1 for a fully correct explanation involving a worked example (oe)
B1 a partially complete explanation

[4]

07. (a) 44, 100, 134, 153, 160 1

B1 cao

(b) 2

B1 ft for at least 4 of 5 points plotted correctly ± ½ sq at end of interval dep on sensible table (condone 1 addition error)
B1 ft (dep on previous B1) for points joined by curve or line segments provided no gradient is negative – ignore any part of graph outside range of their points
(SC B1 if 4 or 5 pts plotted not at end but consistent within each interval and joined)

(c) 30 to 32
15 to 18 3

Median 30 – 32
IQR 40 – 24

B1 ft from their cf graph $\pm\frac{1}{2}$ *sq*

M1 ft from their cf graph identifying "120" and "40"
A1 ft ± 1sq

(d) 2

B2 if fully correct
B1 for box with median or quartiles or whiskers correct

[8]

08. (a) 40, 60, 56, 32 2

B2 for all frequencies correct
(B1 for any 1 frequency correct)

(b) 3

B1 for Frequency density label or appropriate units

B2 for 4 correct histogram bars $\pm\frac{1}{2}$ *sq*

(B1 for 2 bars correct)

[5]

09. (a) 1.8 3

60 × 2.8 = 168
40 × 3.3 = 132
(168 – 132) – 20
B1 for either 60 × 2.8 or 40 × 3.3 or 168 or 132 or 36
M1 for (60 × 2.8 – 40 × 3.3) – 20
A1 cao

(b) $p = q$
Lists are the same size 2

B1cao p = q
B1 cao Lists have the same number of members, are the same size, have the same numbers

[5]

10. (a) 6.08 4

(1 × 10) + (3 × 15) + (5 × 30) + (7 × 35) +
(9 × 25) + (11 × 5) = 730
"730" ÷ 120 = 6.08333

M1 for use of fx with x consistent within intervals (including end points)
M1 (dep) for use of midpoints
M1 (dep on 1st M1) for use of $\frac{\Sigma fx}{\Sigma f}$
A1 6.08 to 6.085

(b) (10), 25, 55, 90, 115, 120 1

B1 for all correct

(c) graph 2

B1 ft for 5 or 6 points plotted correctly ± 1 full (2mm) square at the end of interval dep on sensible table (condone 1 addition error)
B1(dep) for points joined by curve or line segments provided no gradient is negative – ignore any part of graph outside range of their points.
(SC: B1 if 5 or 6 points plotted not at end but consistent within each interval and joined)

(d) 72 – 74 2

M1 (ft dep on graph being cf) for reading from graph at 7
A1 ft ± 1 full (2 mm) square
Or B2 for 72 – 74

[9]

11. (a) Increase = 708 – 620 (=88)

% increase = $\frac{'88'}{620} \times 100$

= 14.1935…

14 or 14.2 or 14.19 4

M1 for 708 –620 (=88)

M1 for $\frac{'88'}{620} \times 100$

OR

M1 for $\frac{708}{620} \times 100$

M1 for '114.19(3…)' – 100

A2 for 14 or 14.2 or 14.19

(A1 for unrounded or truncated answer)

*(**SC** if A0 award B1 for an answer rounded or given to 2dp,*

1dp, 2sf or nearest whole number)

(b) $\frac{129.86}{100-14} \times 100 = \frac{12986}{86}$

151 3

M1 for recognizing that (100 – 14)% is equivalent to 129.86

M1 (dep.) for $\frac{129.86}{'100-14'} \times 100$ *oe*

A1 cao

(c) $\frac{19+20+15}{3}$

18 2

M1 for adding three consecutive numbers and dividing by 3

A1 cao

[9]

12. (a) 38 × 5, 36 × 17.5, 30 × 32.5, 46 × 50

(= 190, 630, 975, 2300)

Σfx = 190 + 630 + 975 + 2300 = 4095

Mean $\Sigma fx / \Sigma f$ = 4095/150

27.3 4

M1 for fx with x within intervals (including ends) at least two consistently

M1 (dep) for fx consistently using midpoints

M1 (dep on 1st M) for use of Σfx / Σf

A1 for 27.3 cao

(b) Frequency density (number of pictures per cm^2)
e.g.
Width 0 to 10 height of rectangle 3.8(k)
Width 10 to 25 height of rectangle 2.4(k)
Width 25 to 40 height of rectangle 2(k)
Width 40 to 60 height of rectangle 2.3(k)
Bars with correct heights, widths, label and scaling 3
B2 for 4 rectangles with correct widths and heights
(B1 for 3 rectangles with correct widths and heights)
B1 for correct label or key and consistent scaling
*(**SC** if 0/3 award M1 if clearly using area or freq. density)*

[7]

13. (a) 12, 33, 69, 92, 100 1
B1 cao

(b) *B1 ft for 4 or 5 points plotted correctly ± 1 full 2 mm square at the end of interval dep on sensible table (condone one addition error)* 2
B1 dep for points joined by curve or line segments provided no gradient is negative. Ignore any point of graph outside range of their points.
SC B1 if 4 or 5 points plotted not at end but consistent within each interval and joined.

(c) 62 – 64 1
B1 62 – 64 otherwise ft from cumulative freq graph

[4]

14. (a) 12, 33, 69, 92, 100 1
B1 cao

(b) *B1 ft for 4 or 5 points plotted correctly ± 1 full 2 mm square at the end of interval dep on sensible table (condone one addition error)* 2
B1 dep for points joined by curve or line segments provided no gradient is negative. Ignore any point of graph outside range of their points.
SC: B1 if 4 or 5 points plotted not at end but consistent within each interval and joined.

(c) 62 – 64 hours 2
B1 62 – 64 otherwise ft from cumulative freq graph
B1 for hours

[5]

15. (a) Heights 24, 32 2

B1 cao for bar from 15 – 17.5, height 24 × 2mm squares
B1 cao for bar from 17.5 – 20, height 32 × 2mm square

(b) Freqs 40, 20, 15 2

B2 cao for all 3 correct
(B1 for any 1 or 2 correct)

(c) Area up to 12.5 = $220x$
Area above 21 = $156x$
Frequency $= \frac{156x}{220x} \times 110$
78 3

M1 for attempt to find area up to 12.5 ***and*** *area above 21 consistently*
M1 for $\frac{156}{220} \times 110$ *or* $\frac{6.24}{8.8} \times 110$ *or* $156 \times \frac{110}{220}$ *oe*
A1 78 cao
SC: If no marks earned B1 for $2mm^2$ *= 1 person oe*

[7]

16. (a) $\frac{90}{240} \times 360$ 2
$= 135$

M1 for $\frac{90}{240}$
A1 for 135

(b) $15 \leq t < 20$ 1

B1 for $15 \leq t < 20$ *Accept 15 – 20*

(c) 95 185 220 235 240 1

B1 for all correct

(d) Points 2

B1 ft for at least 4 or 5 pts plotted correctly (+ 1 sq) at ends of interval dep on sensible table (cf; no more than 1 error)

curve or line segment

B1 (dep on previous B1) for pts joined by curve/line segments provided no gradient is negative
*(SC: B1 if 4 or 5 pts plotted not at ends but consistently within each interval **and** joined)*

(e) 20.5 – 22.0 1

B1 ft from a cf graph using cf = 120 (.5)

[7]

17. $8 \times 41 = 328$
$2 \times 29 = 58$
$328 - 58 = 270$
$270 \div 6 = 45$

$= 45$ 3

M1 for either 8×41 (= 328) or 2×29 (= 58)

M1 (dep) "328" – "58" (= 270)

A1 cao

NB 328 and/or 58 on the answer line gets M1 (implied); 270 on the answer line gets M2 (implied)

[3]

18. (a) Reason 1

B1 eg "mode is 7"
"the mode is the one of which there is the most"
"because its got the lowest frequency"

(b) $4 \times 4 = 16$
$5 \times 7 = 35$
$6 \times 10 = 60$
$7 \times 12 = 84$
$8 \times 5 = 40$
$9 \times 2 = 18$

$= 6.325$ 3

Mean $= \frac{\Sigma ft}{\Sigma f} = "\frac{253}{40}"$

M1 Σfx (at least 3, implied by answers) or 253 seen

M1 (dep) $\frac{\Sigma ft}{\Sigma f}$

A1 6.325, 6.33, 6.3, 6.32

(c) 7 1

B1 cao
NB 6.5 leading to 7 gets B0

(d) Beccy has a bigger sample 1

B1 for Beccy and reason

[6]

19. (a) $\frac{1240 + 1270 + 1330}{3}$

$= 1280$ 2

M1 $\frac{1240 + 1270 + 1330}{3} = \frac{3840}{3}$

accept 1240 + 1270 + 1330 ÷ 3 oe

A1 cao

(b) $\frac{1300+1330+x}{3}=1350$ 2

$= 1420$

or $(1350 \times 3) - (1300 + 1330) = 4050 - 2630$

M1 $\frac{1300+1330+x}{3}=1350$

or

(1350 × 3) – (1300 + 1330) or 4050 – 2630

A1 cao

[4]

20. (a) (18), 40, 75, 90, 98, 100 1

B1 for all correct

(b) 2

B1 ft for 5 or 6 points plotted correctly ±1 full (2mm) square at the end of interval dep on sensible table (condone 1 addition error)
B1 (dep) for points joined by curve or line segments provided no gradient is negative – ignore any part of graph outside range of their points
(SC:B1 if 5 or 6 points plotted not at end but consistent within each interval and joined)

(c) approx 46 1

B1 (ft dep on graph being cf) for reading from graph at 50 ± 1 full (2mm) square

[4]

21. Correct histogram 3

Heights in proportion 5 : 20 : 8

B3 for fully correct histogram with axes scaled
***OR** labelled*
(B2: fully correct but one error)
(B1: fully correct but two errors)

[3]

22. (10), 36, 18, 22, 16 2

B2 for all 4 answers correct
(B1 for any 2 correct answers)

[2]

23. (i) 152

B1 cao

(ii) 177 2

B1 cao

[2]

24. 20

$\frac{23+31+15+11}{4}$

19

$\frac{31+15+11+19}{4}$ 3

M1 for finding the mean of any 4 consecutive months
A1 for 20
A1 for 19

[3]

25. (a) table 1

13, 30, 60, 81, 88, 90

B1

(b) graph 2

B1 for plotting points correctly ± ½ sq (condone one error)
B1 (dep) for joining points to give cf graph.
SC: B1 if points plotted consistently within intervals (condone one error) and joined.

(c) 35 – 36 1

his reading at 45

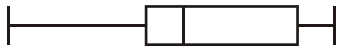
B1ft. from a cf graph ± ½ sq

(d) 64 – 65 2

90 – reading at 28

M1 ft. 90 – (reading at 28)
A1 ft.

[6]

26.  3

10 33 43 68 75

M1 for 33 and 68 marked
M1 for maximum mark at 75 and minimum mark at 10
A1 for completely correct box plot

[3]

27. (a) bar to 3 1

Bar 6cm high … (to 3) in correct place

B1 cao

(b) 45 1

B1 cao

[2]

28. (a) $40 \leq w < 60$ 2

$(60 + 1) \div 2 = 30.5^{th}$ term needed

*M1 for clear use of 30.5^{th} **or** 30^{th} term or $47 \leq ans \leq 49$*
A1 cao

(b) 34 2

66 – 32

M1 clear use of graph for LQ or UQ
A1 for $34 \leq ans \leq 36$

(c) 12 2

60 – 48

*M1 read from graph **and** subtract from 60*
A1 for 11, 12 or 13

[6]

29. (a) 30 1

30×1

B1 cao

(b) 94 2

$10 \times 2.2 + 45 \times 1.6 = 22 + 72$

M1 for 10×2.2 or 45×1.6
A1 cao

[3]

30. (a) 78
$(58 + 64 + 86 + 104) \div 4$

79.75
$(64 + 86 + 104 + 65) \div 4$

81.25
$(86 + 104 + 65 + 70) \div 4$ 2

B2 for all correct or 78, 79 or 80, 81
(B1 for one correct <u>or</u> one correct unevaluated moving average <u>or</u> full set of 3 point moving averages ($69.\dot{3}$, $84.\dot{6}$, 85, $79.\dot{6}$) <u>or</u> one of 234, 270.25, 272.5)

(b) increasing 1

B1 ft for more DVDs being sold oe

[3]

31. 4, 16, 21, 8 2

B2 for 4 correct
(B1 for 2 or 3 correct)

[2]

32. 6.08 4

$(1 \times 10) + (3 \times 15) + (5 \times 30) + (7 \times 35) +$
$(9 \times 25) + (11 \times 5) = 730$
"730" $\div 120 = 6.08333$

M1 for use of fx with x consistent within intervals (including end points)
M1 (dep) for use of midpoints
M1 (dep on 1st M1) for use of $\frac{\sum fx}{\sum f}$
A1 6.08 to 6.085

[4]

33. (a) (10), 25, 55, 90, 115, 120 1

B1 for all correct

(b) graph 2

B1 ft for 5 or 6 plotted correctly ± 1 full (2mm) square at end of interval dep. on sensible table (condone one addition error)
B1 (dep) for points joints by curve or line provided no gradient is negative – ignore any part of graph outside range of their points
(SC: B1 If 5 or 6 points plotted not at end but consistent within each interval and joined)
M1 (ft dep on graph being cf) for reading from graph at 7

(c) 72 – 74 2

A1 ft ± 1 full (2 mm) square
***OR** B2 for 72 – 74*

[5]

34. Column heights of:
3.5 3 4.4 2.2
Histogram 3

M1 for use of frequency density
A1 correct width of 3 or 4 bars
A1 fully correct histogram

[3]

35. $\frac{9375 + 8907 + 9255}{3}$
$\frac{8907 + 9255 + 9420}{3}$
9179, 9194 2

M1 for adding 3 consecutive figures and dividing by 3 OR adding 2 sets of 3 consecutive figures
A1 cao

[2]

36. (a) 35 1

B1

(b) 57 – 13
44 1

B1

[2]

37. (20), 90, 50, 40, 20 2

B2 for all 4 correct
(B1 for 2 or 3 correct)

Alternative Scheme
B2 for 9, 5, 4, 2
(B1 for 2 or 3 of 9, 5, 4, 2)

[2]

38. Bars of heights
3, 4.2, 2, 0.4 3

B3 for all 4 bars fully correct ± ½ square
(B2 for 3 bars fully correct)
(B1 for 2 bars fully correct)
SC: If no marks scored then B1 for use of frequency density: at least one correct result must be seen

[3]

39. (a) $\frac{270+324+300+258}{4}$

$\frac{324+300+258+309}{4}$

$\frac{300+258+309+335}{4}$

288, 297.75, 300.5 2

M1 for adding 4 consecutive numbers and dividing by 4
A1

(SC: B1 for 3 or 4 of 298, 294, 289, $300\frac{2}{3}$)

(b) *B1 for upwards trend; moving average increasing, sales increasing* 1

[3]

40. **40**, 20, **75**, **30**, **50** 2

B2 for all values correct
(B1 for 2 or 3 correct values)

[2]

41. (351 + 435 + 582) ÷ 3 = 1368 ÷ 3
456
(435 + 582 + 372) ÷ 3 = 1389 ÷ 3
463 2

M1 for (351+435+582) ÷ 3 oe
or (435+582+372) ÷ 3 oe
or 456 seen or 463 seen
A1 for 456 and 463 cao

[2]

42. (a) Heights 24, 32 2

B1 cao for bar from 15 – 17.5, height 24 × 2 mm squares
B1 cao for bar from 17.5 – 20, height 32 × 2 mm square

(b) Freqs 40, 20, 15 2

B2 cao for all 3 correct
(B1 for any 1 or 2 correct)

[4]

43. 4 × 10 = 40 4
7 × 30 = 210
10 × 50 = 500
22 × 70 = 1540
7 × 90 = 630
(40 + 210 + 500 + 1540 + 630) ÷ 50
= 58.4

M1 for use of fx with x consistent within intervals (including end points)
M1 (dep) for use of mid-intervals (eg 10 or 10.5)
M1 (dep on 1st M1) for "(40+210+500+1540+630)" ÷ 50 or 2920 ÷ 50
A1 cao
Alternative using 10.5 etc is 2945 ÷ 50 = 58.9

[4]

44. (a) (255 + 235 + 260) ÷ 3
(235 + 260 + 261) ÷ 3
(260 + 261 + 298) ÷ 3
= 250, 252, 273 2

M1 for either (255 + 235 + 260) ÷ 3 or (235 + 260 + 261) ÷ 3 or (260 + 261 + 298) ÷ 3 or 250 or 252 or 273 in any order; condone missing brackets.
A1 cao

(b) Sales increased 1

B1 for acceptable explanation
eg rising, increasing, sell the most at the end of the year

[3]

45. (352 + 336 + 272 + 256) ÷ 4 2
(336 + 272 + 256 + 264) ÷ 4
= (325), 304, 282

M1 for valid method for one moving average or one correct
A1 for 2 correct and in correct order
SC B1 for 282, 304

[2]

46. (a) (3940 + 3810 + 4230 + 4560) ÷ 4 2
= 16540 ÷ 4
= 4135

M1 for (3940 + 3810 + 4230 + 4560) ÷ 4
A1 cao

(b) Plot (6.5, "4135") 1

B1 ft for plotting (6.5, 4135) or (6.5, "4135") ± 1 square

(c) Trend line 1

B1 for a correct straight trend line between (2.5, 3600) and (2.5, 3700) to (6.5, 4100) and (6.5, 4200) with at least 1 point on either side of the line or at least 2 points on the line.

[4]

47. (a) (25 + 30 + 29) ÷ 3
28 2

M1 for (25+30+29)÷3 or 84÷3 (condone missing brackets)
A1 cao

(b) 1

B1 for plotting 3 points (6, 26), (7, 27), (8, 26)

(c) 1

B1 for trend line between (2, 24) and (2, 26.5) and between (8, 25) and (8, 27.5)

(d) trend is upwards 1

B1 for trend is upwards oe

[5]

48. (a) 82 2

M1 for (99 + 63 + 92 + 74) ÷ 4 or 328 ÷ 4
A1 cao

(b) Decreasing 1

B1 for decreasing oe

(c) Heights = 5, 20, 40, 75, 100

Correct cumulative frequency graph 2

B2 for fully correct cumulative frequency graph
(Ignore any part of graph outside range of points)
(B1 for 4 or 5 points plotted correctly ± 1 full (2mm) square at the end of interval
or for 4 or 5 points plotted not at end but consistent within each interval and joined)

(d) 640 – 680 1

B1 for 640 – 680 or ft (dep on graph being cf)
for reading from graph at 50 ± 1 full (2mm) square

[6]

49. (a) (623 + 640 + 639) ÷ 3
634 2

M1 for either (623 + 640 + 639) ÷ 3 or (608 + 595 + 597) ÷ 3 or (595 + 597 + 623) ÷ 3 or (597 + 623 + 640) ÷ 3 seen with no other inconsistent approach
A1 cao

(b) Increase (upwards) 1

B1 for increase or upwards trend or 'number of births went up' or 'it goes up' oe

[3]

50. (a) $0.25 < p \leq 0.50$ 1

B1 for $0.25 < p \leq 0.50$ (accept 0.25 to 0.5(0) or clearly identified on the diagram as the mode)

(b) $0.5 < n \leq 0.75$ 1

B1 for $0.5 < n \leq 0.75$ (accept 0.5(0) to 0.75 or clearly identified on the diagram as the median)

(c) 4, 13, 17, 22, 28, 29, 30 1

B1 cao

(d) cf graph 2

B2 for a fully correct cf graph (accept ogive)

[B1 for 5 or 6 consistent, correctly plotted points from a sensible cf table (increasing values) OR for a cf graph drawn through points other than the end points of each interval]

(e) 9 or 10 or 11 2

M1 for clear method to read off from a cf graph at area = 0.90, on the cf scale, can be awarded from their reading ± 1sq
A1 ft for an answer of 9 or 10 or 11
[B1 for an answer in the range 9 to 11 if M0 scored]

[7]

01. Paper 3

Responses to this question were centre-dependent. In part (a) candidates showed little understanding of the term "quartile", often giving the lowest (132) and highest (182) number in the list. In part (b) it was very rare that any candidate demonstrated what a box & whisker diagram is. Most merely plotted the numbers as a series of points (crosses) across the bottom of the scale. Of those who did show some understanding, there were usually errors in their diagram, perhaps missing off the whiskers, or leaving the diagram as a series of vertical lines rather than a box; rarely was there any indication of the median. This is a topic which centres are advised to spend more time on in the future.

Paper 5

The response to this question on box plots was very mixed and tended to be very centre-based. In part (a) the most common wrong answers were 114.5 and 169.5. Although candidates were able to plot these values a significant minority did not draw the relevant (follow through) box. Those who drew the box frequently also drew the correct whiskers but some then failed to indicate the median or indicated its value at 157.

02. Many candidates gained full marks for this question. All but the very weakest generally drew the first bar correctly. The common wrong values in the table were 40 and 80.

03. **Paper 4**

The correct class interval was often given in part (a), but some candidates chose the interval containing the number 20 (or 20.5), i. e. $0<C\leq 50$. Various incorrect methods were used. Some candidates wrote down $40 \div 5 = 8$ and gave the interval $0<C\leq 50$ and a few attempted to calculate an estimate of the mean and used this to write down the class interval. Part (b) was completed poorly. Most of those who gained a mark did so for explaining that £1000 was too large to be included in the table rather than for identifying the position of the median as being near the bottom of the class interval. Candidates usually gained either three marks or no marks in part (c). A pleasing number gave the correct answer of £6500 but many obtained an answer of £6240 by finding 120% of £5200.

Paper 6

Competent candidates did part (a) well, by finding the location of the 20^{th} or interpolating between the 20^{th} and 21^{st} values. Part (b) proved to be more difficult as candidates had to give a clear explanation for their answer. The most successful ones were those who referred to the 20.5^{th} or 21^{st} values, but other candidates gained the mark by commenting that the old median was at the start of the interval so the class interval would not change.
Part (c) was a standard reverse percentage, which many candidates recognised. However, many did not and gave the answer as £6240.

04. **Paper 3**

Part (a) was answered well by all but the weakest candidates. Many of those who completed the table correctly then gained both marks in part (b). The cumulative frequency graphs were generally drawn accurately and it was pleasing that fewer candidates than usual plotted the points at the mid-interval values of h. In part (c), though, many candidates failed to interpret the scale on the horizontal axis correctly.

Paper 5

This cumulative frequency question was a good source of marks for many candidates. Although the usual error of plotting at the mid-interval points was seen, by far the greatest loss of a mark was misreading the scale on the horizontal axis when answering the final part of the question.

05. The improvement in the success with which candidates answer questions such as this has been maintained. Many candidates had a clear idea of the concept of frequency density and were able to relate the diagram to the table in both parts.

06. **Mathematics A**

Paper 4

Very few candidates gave the impression of ever having studied this topic; many failed to attempt it. Some worked out the mean of all 6 months, whilst a common error failed to use their calculators correctly and pressed ÷ before totalling. In part (b) many candidates failed to give an answer that was little more than a re-statement of the question. There were, however, some good attempts at explaining the situation. The most successful candidates were those who included a numerical example of the difference.

Paper 6

Success was very much centre specific for part (a) with many candidates opting to find the mean of all six values or the means of the first 3 and the last 3.
Most candidates could give a partial answer for part (b) by essentially repeating the stem of the question. The more successful candidates used a combination of multipliers ($0.8 \times 0.7 = 0.56$) or gave a specific example (usually based on a multiple of £10)

Mathematics B Paper 17

Understanding of moving averages was centre dependant; many candidates finding the mean of all 6 months in an effort to salvage something from the lack of coverage of this topic.
147 + 161 + 238/3 = 387 etc was a common error, showing knowledge of the topic but misuse of the calculator.
In part (b) many candidates clearly understood the problem but found difficulty in verbalising their explanation; those who chose to illustrate their reasoning with an example usually succeeded.
A number of candidates merely tried to re-write the question and those misunderstanding the problem usually based their argument on Fun Friday having an extra 10% reduction only.

07. This question was very well understood by all candidates at this tier. 94% of candidates correctly worked out the cumulative frequency and 72% were able to draw the cumulative frequency graph correctly. 60% of candidates were able then to work out the median and interquartile range from their graphs. The box plot was very well answered with 85% of candidates getting both marks.

08. The performance in this very straightforward histogram question was very disappointing. Only 25% of candidates could correctly calculate the area of the bars and so the frequencies in part (a) and in part (b) only 20% of candidates gained all the marks. Frequently the vertical axis was left with no label even though an example was given in part (a).

09. Paper 4

Part (a) was another badly attempted question, with candidates showing little or no understanding of means. Many candidates gave 3.3 – 2.8 = 0.5 as their answer. Part (b) was rarely attempted. The weaker candidates describe the process of calculation:$p + q \div 2$. Some candidates gained a single mark for stating that "the two lists must have the same amount of numbers in them".

Paper 6

This was a more unusual type of mean question. The key idea in part (a) was to work through the totals. So, the key starting calculation was 60 × 2.8. Many candidates started this way but were then incapable of making any further progress.
Part (b) was an unusual question, partly algebraic. It was pleasing to see that many candidates were able to find at least one mark, usually by stating that the number of numbers in each list had to be the same.

10. Higher Tier

(a) A standard calculation of the mean of a grouped frequency table. Many candidates could do this. However, there were still many who failed to gain full marks. A common error was to use the upper end of the interval leading to an answer one hour longer than the true mean. A second incorrect approach was to find an estimate of the total number of hours taken (730) and divide by either 6 or 12. Some candidates found the median or gave the answer as a class interval. Cumulative frequency diagrams are well known and centres have been very successful in training candidates on such questions. The vast majority of candidates scored full marks. Only a few plotted the points at the mid point of the interval. Most candidates were able to find an estimate for the number of children who used a computer for less than 7 hours. A minority thought this meant drawing a line at $t = 6.8$

Intermediate Tier

Part (a) was answered poorly with many candidates having little idea how to estimate the mean of a set of grouped data. The most common response was to work out the mean of the frequencies by dividing 120 by 6. Candidates with some idea of the correct method often used the upper boundaries instead of the mid-points and even some of those who correctly obtained 730 then proceeded to divide by 6 rather than by 120. Candidates were much more successful in part (b) with two-thirds completing the table correctly. A common incorrect response was "10, 14, 20, 28, 38, 50" and some simply wrote down the frequencies. Many of the candidates who successfully completed the table were able to plot the points correctly although mistakes in plotting (4, 25), (6, 55) and particularly (10, 115) were common. It was pleasing that to see that most plotted at the ends of the intervals although some did plot at the mid-points. However, there were a significant number of candidates who either did not join the points to give a cumulative frequency graph or drew a line of best fit instead. Part (d) was well answered by those who had drawn a cumulative frequency graph.

11. Intermediate Tier

It was surprising that part (a) caused as many problems as it did. Most candidates worked out the increase as 88 but the majority could not then calculate the percentage increase. Some calculated 88 as a percentage of 708 or 1328 while others calculated 620 as a percentage of 708. Many simply wrote 88% as the answer.
Candidates always tend to struggle with reverse percentage questions and this one, in part (b), was no exception. Only candidates who realised that £129.86 was 86% of the normal price were successful. Most worked out 14% of £129.86 and added it on.
In part (c) more than 60% of candidates calculated an average of three consecutive numbers but only one quarter of these worked out the second three-month moving average. The most common answer was 27, from using the last three months

Higher Tier

In (a), about equal numbers of candidates chose to calculate either $\frac{88}{620} \times 100$ or $\frac{708}{620} \times 100 - 100$ and virtually all of these were able to give their answer to an appropriate degree of accuracy. Some of the weaker candidates knew that they needed to calculate 88, but were then unsure as to how proceed, 88% or 0.88% were common answers. There were a worrying number of candidates who attempted to do this question by trial and improvement.
In part (b), candidates either knew how to do the calculation or they didn't. Calculating a 14% reduction (or increase) in the cost was a common misunderstanding. Again there were many attempts to do this by trial and improvement.
Part (c) was done quite well by the majority of the candidates, but there were many, including some of the most able, who thought the second 3-point moving average was derived from the values 15, 27 and 39, thus demonstrating a lack of understanding in the way these averages overlap.

12. Many candidates were able to use a value from within each class interval to calculate $\sum fx$, but multiplications and additions were often careless. Some were confused about the midpoints 17.5 and 32.5 and these were often rounded to an integer. Having calculated $\sum fx$ correctly, some went on to divide by 4, whilst others divided by the sum of the midpoints.
In part (b), a significant proportion of candidates did not know how to draw a histogram. This was usually given as a bar chart or frequency polygon. A large number of candidates did not gain the mark for labelling the vertical axis or giving a key.

13. Specification A

The majority of the candidates realised what was needed in the table, though some weaker candidates were unable to add the numbers up correctly. The majority of the candidates drew a correct cumulative frequency table; those who plotted the frequency table received no marks. Cumulative frequency graphs were sometimes plotted at the midpoint or the lower end of the interval. It was disappointing to see a large number of graphs in which the points were not joined. There were few errors in vertical plotting. In part (c) there were too many errors in reading off from the graphs, the most common of which was to read off 62.5 as 65.

Specification B

Many fully correct solutions were seen. Those candidates that drew a cumulative frequency graph were generally then successful at using the graph correctly to find an estimate for the median. Some students did, however, misread the scale on the horizontal axis. More students than usual plotted the cumulative frequency graph, incorrectly using 'mid-interval' rather than end of interval values on the *x* axis. Another common error was to plot the *x* values incorrectly at 52.5, 55, 57.5… A small minority of candidates drew a histogram rather than a cumulative frequency graph.

14. This question was done well by the majority of the candidates. Most candidates were able to plot their cumulative frequencies against upper class boundaries and subsequently interpret their graph to find the median. Virtually all the candidates were able to score a mark for the units. Common, but relatively infrequent mistakes, were due to plotting values against mid- interval values or drawing bar graphs. Some candidates were unable to interpret accurately the horizontal scale for the median.

15. Candidates were much more successful at completing the table in part (b) than they were at completing the histogram in part (a).
Common errors in part (a) were to have the bars the wrong way round, or just to have a single bar across the width.
About half the candidates were able to get full marks in part (b). Some common errors in the table were 40, 20, 30 or 80, 40, 10 or 32, 16, 12.
Only the best candidates were able to do part (c). The majority did not attempt to compare the two areas, typically working only with area up to 12.5. Some candidates were able to gain credit for identifying One person = One 2 mm square

16. The majority of candidates were not able to calculate the angle for a pie chart. Many related the number of people (240) to 360° as 2/3, or used 35 instead of 95. Working was rarely shown. The usual wrong answer in part (b) was 25 to 30 using the middle on the table. The table was usually completed correctly, but there were many examples of incorrect addition, surprising since calculators were available. Attempts are graphing were also disappointing, with a significant number of candidates showing inaccuracy in plotting, or plotting at pints other than at the top end of the class interval, a greater proportion than recently seen. Few were able to use their graphs to arrive at a value for the median, many using 150 or 125, rather than the mid-way value from their graph.

17. Higher Tier

Responses to this question were quite encouraging, with many candidates working out the equivalent of $\frac{8\times 41-2\times 29}{8-2}$. Some candidates resorted to trial and error and got the correct answer whilst others made up there own numbers to fit the description of the problem. One or two impressively defined algebraic variables and solved the problem that way.

Intermediate Tier

A large number of candidates attempted this question but many gave 41 – 29 = 12 as their solution. A number who calculated 41 × 8 and/or 29 × 2 abandoned this and lost the mark they might have gained giving alternative wrong working leading to their given solution. Others having obtained 328 and 58 added the numbers or failed to produce further working. Some attempted to find 8 numbers which would give a mean of 41 but failed to identify 328 as the solution. Not many correct solutions were seen and again candidates failed to notice unrealistic answers or to appreciate that 4 marks would require a more complex calculation.

18. In part (a) many candidates gained the mark, usually for defining the mode as the "highest frequency", or by stating that the correct mode was 7. In part (b) only a few were able to gain full marks. Some worked out cumulative frequency. Others found fxs, but didn't use them. The most common incorrect working was 40÷6=6.66 Many found more success in part (c), though an incorrect answer of 13.5 was regularly given, and sometimes 6.5 taking no account of the frequencies. Part (d) was well answered with many recognising that a large sample was better. Most of those incorrectly giving Ali attempted to justify their answer by referring to Ali being unreliable because he was wrong in (a).

19. Higher Tier

Answers to these questions have gradually improved. Many candidates were able to write down and complete a correct calculation. A few decided to work out all 3 moving averages and were awarded the marks providing they were correct and were clearly indicated. There were an alarming number of arithmetic errors which suggested calculators were not being used correctly.

On part (b) some candidates adopted an algebraic approach and considered the equation $\frac{1300+1330+x}{3}=1350$ whilst others wrote down and worked out 1350 × 3 and then subtracted the 1300 and 1330 values.

Intermediate Tier

It remains the case that many candidates have little or no understanding of moving averages. In part (a) those who showed some knowledge often added the three values to give 3840 but then failed to divide by 3. Many used the number of televisions as a sequence of numbers and tried to find the June value by looking at differences. Part (b) was not well answered, and many did not attempt it. It was common to see frequencies treated as a series.

20. The majority of candidates were able to pick up some marks on this question. In part (a), the cumulative frequency table was usually accurate, although careless arithmetic errors were often seen. Accurate plotting was a little less well done, and a significant number of candidates failed to either plot points at the end of the intervals or in many cases drew histograms. In part (c), Many candidates read their median from the cf axis from either 50 (to give an answer of 60) or 60 (to give an answer of 75) on the horizontal axis.

21. It was clear that this topic had not been covered by some centres. Of those candidates who understood how to draw a histogram, a number clearly struggled to evaluate 24 ÷ 15 without a calculator. The majority of candidates used the frequencies given for the heights of their bars.

22. This was mostly answered well. Candidates who had a clear understanding of histograms generally gave the four correct answers. Most weaker candidates just wrote down the heights of the bars.

23. This question was centre dependant and it was clear that finding quartiles of discrete data had not been covered in all but a few centres. Where this had been taught, correct answers were frequent, with minor errors being made on occasions.

24. The concept of moving averages has clearly not been taught in many centres. More able candidates were able to score quite well, however, by finding the mean of the first four entries. This was usually followed by the mean of the last four monthly entries and thus answers of 20 and 17 were seen regularly. Weaker candidates tended to merely pull numbers out of the table or quote months as their answers. A few candidates wrote the 8 numbers in the table in order and found the middle numbers; again care had to be taken to ensure that “correct” answers were not found this way.

25. A good number of candidates were able to gain full marks on this question. It was, however, clear that this topic had not been taught by some centres. It is important that candidates do show the examiner where they take their readings from, this is done most effectively by drawing in relevant horizontal and vertical lines on the graph. Some candidates misread part (d) and failed to subtract their reading from the graph from 90. A minority of candidates used 100 for the number of students in the question rather than 90.

26. This question successfully tested the candidates' understanding of a box plot; it was clear that many candidates knew what a box plot should look like but were unable to use the information given to draw their box plot correctly. Some candidates tried to draw a (very small) cumulative frequency diagram. Successful candidates understood how to use the range together with the minimum to obtain the maximum mark scored as well as how to use the lower quartile with the interquartile range to obtain the upper quartile.

27. This question was answered correctly by about 75% of the candidates.

28. Only about half the candidates were correctly able to identify the class interval for the median. A common error was to give the interval as $20 \leq w < 40$ as the number 30 (half the number of office workers) lay within this interval. The use of the cumulative frequency curve to find the interquartile range was poorly done; less than a third of candidates were able to gain full marks. The most common error seen was to use 70 for the number of office workers rather than 60 as quoted in the question. Likewise, in part (c) a significant number of candidates read from the graph correctly but then subtracted from 70 instead of 60. In both parts (b) and (c) some candidates had trouble coping with the scale on the horizontal axis; 30 was frequently misread as 25. Despite the word more being given in bold type in the question, a significant number of candidates gave the number of workers who could type less than 70 words per minute.

29. A significant number of candidates just looked at the height of the bars and gave these as incorrect answers. The majority of candidates were able to appreciate the fact that the given diagram was a histogram.

30. From comments written in the answer space for this question it was clear that some candidates felt that they had not met this topic prior to the examination. Indeed, "four point moving average" did not appear to be a familiar phrase to many candidates with just under half of the candidates failing to score any marks in part (a). The mean of all six values was frequently found. Three point moving averages were a common occurrence. A number of candidates failed to evaluate the sum before dividing by four, suggesting the incorrect use of a calculator. Of those who found the correct moving averages it was quite common for them to continue to find the mean of these or to find (104 + 65 + 70 + 58)/4. In part (b) many candidates failed to appreciate the concept of a trend. A very common incorrect answer was to state that more DVDs were sold at the end of the year because it was Christmas.

31. Just under 50% of candidates were unable to gain any marks on this question. The most common error was to read the heights of the bars from the y axis and not to take the area of the histogram into account. Of those candidates who understood the concept of frequency density the majority scored full marks; just over a third of all candidates.

32. This was poorly done and a notable deterioration in performance, to that of recent years. 120 ÷ 6 = 20 and 36 ÷ 6 = 6 were the most common mistakes made, usually by weaker candidates, while those who showed some understanding of the method often either made arithmetic errors or errors in their use of the grouped data (time), taking the upper or lower limits of the ranges instead of the mid-points. It was not uncommon to see the Σfx evaluated correctly to 730 followed by division by 6, instead of 120.

33. Over 80% of candidates gave fully correct solutions to the whole of this question. A small minority of candidates plotted their graph at 'mod-interval' rather than at the end of each interval. Candidates should be reminded to draw relevant lines on the graph to indicate where any readings are taken from.

34. Many correct histograms were seen. Candidates should, however, be advised to show their division and write down the proposed heights of their bars before drawing the histogram. Some evidence of poor arithmetic was seen. The most common error was to give 11 ÷5 as 2.1 rather than 2.2. A small minority of candidates drew the final bar with a width of 15 rather than 5 and so failed to gain full credit.

35. The success of candidates with this question did appear to be very centre dependent with only about half of all candidates able to gain some credit. Many correct answers were seen but, equally, candidates simply found the average of all four given numbers. There was clear evidence of incorrect use of calculators whereby the sum was not evaluated (or brackets not used) before the division was attempted.

36. In part (a) many candidates identified the correct median; however an answer of 30 was very common. In part (b), 20 (40 – 20), 57 – 13 and 13 to 57 were the usual mistakes made.

37. This question was well answered with approximately 70% of candidates scoring full marks. Once again, there was evidence of poor arithmetic with 30 × 3 being evaluated as 60 being the most common error.

38. A fully correct histogram was drawn by approximately 30% of candidates. The most common error was to evaluate the height of the final bar incorrectly. Many candidates were unable to deal with the division of 6 ÷15. This calculation was generally done correctly by those candidates who wrote it down as a fraction. Many candidates calculated 15 ÷ 6 and obtained the commonly seen incorrect height of 2.5

39. It was encouraging to see more candidates being able to provide a fully correct solution to part (a) than has been the case in recent examination sessions. A few candidates used their calculator incorrectly, forgetting to obtain the answer to the additions before dividing by 4. Some candidates omitted the division completely. A small minority of candidates misread the question and gave the set of 3-point rather than the required 4-point moving averages. In part (b) most candidates were able to identify that the trend was an increase in sales although some candidates did describe the pattern of sales from 3 month to 3month period or give the period when most CDs were sold.

40. Approximately 70% of candidates were able to give all the correct frequencies. The most common error was for candidates to read off the *y* axis as they would for a bar chart.

41. It is clear that many candidates did not understand the concept of moving averages. Many used the first two moving averages given as the first two terms of a linear sequence, found the difference of 9, and then gave 452 (443 + 9) and 461 (452 + 9) as their answer. Some candidates found the mean of all the whole data. Often working out was not shown.

42. Approximately 35% of candidates were able to complete the histogram correctly while just over 50% of candidates were able to complete the table correctly.

43. Attempts at this question were mixes, with full marks not common. Typically errors included a failure to use the midpoint, division by 5 instead of 50, or multiplication of *f* by 20 throughout. It was discouraging to see so many candidates filling one of the columns with cumulative frequency. Errors also included those candidates who were inconsistent in the figures chosen to multiply the frequency. Generally a question which most candidates had difficulty, due to their lack of knowledge of process.

44. Far more candidates than is usually the case were able to give the correct moving averages, without resorting to producing a number series. Little working out was shown, yet the correct answers were given in the right order. Nearly all candidates were able to interpret their figures correctly in part (b).

45. It was disappointing to see some candidates not attempting this question. However, the success rate for those who did was high. Some candidates showed that they were using the right method, but their incorrect use of the calculator caused problems. A failure to press the equals key after adding led to the answers 1024 and 930 seen. Other incorrect answers came from dividing by the wrong number, 3 being the most common.

46. The calculation of the fifth four-point moving average using the information given in the table of values produced a significant number of correct responses. However, many used the previously calculated averages and treated them as a sequence of numbers. As there wasn't a common difference between the values this gave rise to some unrealistic results. There was a follow through from part (a) to part (b) in which the value for the fifth moving average was to be plotted on the graph; this allowed many to gain the mark for the plotting.

In part (c) the trend line was to be drawn in on the graph. With four moving average points already plotted it gave a hint as to where it should be located, especially as the points lay in almost a straight line. The success at indicating the trend line, however, seemed to be decided by where they had positioned the fifth point as there was a strong desire to 'join up' all the points, straight line or otherwise.

47. It appears that many candidates are not familiar with the context of moving averages. Part (a) was answered correctly by over 70% of candidates but a surprising number used the 3-point moving averages already given to calculate the moving average required. A few candidates treated the problem as a sequence and attempted to find a pattern in the moving averages given. Answers to parts (b), (c) and (d) were disappointing. Most candidates plotted the moving averages though a significant minority failed to understand the vertical scale and plotted the points incorrectly. Many candidates did not understand the need to draw a straight line in part (c) despite a similar question appearing on a recent examination paper. Often candidates mistakenly thought that joining the points would suffice.

In part (d) the meaning of the word "trend" was missed by many candidates who merely described the fluctuation in the moving averages rather than the overall trend. Any answer indicating an "increase" or "upward trend" was acceptable here. A description of correlation was often given. This, on its own, was not acceptable.

48. Many candidates were not aware of how to find the last moving average in (a). By far the most common error was to find a three-point moving average, with some candidates even finding the average of the moving averages given.

In part (b) many candidates did not understand what was required and commented on the number of televisions sold each month. All that was required was to say that the trend was decreasing yet many went into great detail about every number in the table. In parts (a) and (b) 29% of the candidates scored all 3 marks with a further 44% scoring 2 marks. 20% of the candidates scored no marks at all.

Many candidates were successful in parts (c) and (d) with 38% scoring all 3 marks and a further 20% scoring two marks. Quite a few candidates plotted the cumulative frequency values at 100, 200, 300, 400 and 500 thinking that the points needed to be plotted at the midpoints of the price intervals, clearly not understanding the question.

Some of these candidates did, however, go on and earn the mark in (d) for correctly reading from their graph. Some plotted the points in the correct position but then failed to join the points whilst others plotted the points correctly but then proceeded to draw a line of best fit. Nearly 20% of the candidates scored no marks at all on the final two parts of the question.

49. Working out a moving average is becoming a regular visitor to the calculator section of this paper but only 54% of candidates obtained the correct answer of 634. It was very common to see candidates trying to make a number sequence out of the 3 given moving averages and writing 645 for their answer. Other candidates wrote down 3 numbers, obviously thinking that a 3 point moving average needed 3 numbers. In part (b) candidates did not seem to realise that the trend should be based upon the moving averages rather than on the original data. Only 27% of candidates scored the mark in this part as candidates often wrote it went down in 2001 and then back up until 2004 and then dropped again. Another common error in this part was to comment on correlation rather than trend.

50. This cumulative frequency question was very well understood by the majority of candidates with success rates of over 75% in parts (a), (b) and (c). The most common incorrect response in part (a) was stating the frequency of 9 rather than the class interval and in (b) the incorrect responses centred on finding the median of the frequency numbers, and 0.75 – 100 as it was in the middle of the table).

Candidates were slightly less successful in part (d) where they had to draw the cumulative frequency curve. Line segments were accepted but many candidates lost a mark for poor plotting or plotting the points in the middle or at the beginning of the class interval. In part (e) the success rate dropped even more to 10%. Candidates could score 1 mark for an integer answer of 9, 10 or 11 without showing their working or for showing their working but then forgetting to take their cumulative frequency reading from 30. Candidates also struggled to interpret the horizontal scale, and it was often difficult to ascertain evidence of their line at 0.9. A small minority of candidates chose 4 for their answer, the number of groups with a value equal or higher than 0.9